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Medical Progress in 1912

Medicine is advancing in every branch, and the passing of the years brings forth new and fruitful results. The year of 1912 was no exception. Carrel's marvellous revelations are too fresh in the minds of physicians to necessitate rehearsal other than to warrant the comment that Carrel seems destined to unfold to the world mysteries that have ever been hidden from the eyes of man.

Ehrlich has added new laurels to his wreath with the presentation of neosalvarsan, an improvement on his old arseno-benzol. He is also engaged with von Wassermann and others in the study of cancer, and we make bold to prophecy that this intrepid scientist will eventually discover a drug as potent in the treatment of cancer as his arsenical products are in syphilis.

The use of vaccines and serums as remedial agents has received a marked impetus during the past year. It is now possible to treat a great variety of diseases with these agents, and success seems to follow their administration. Apparently they will play an important role in our scheme of treatment in the future. In an early issue THE MEDICAL TIMES will present an exhaustive resume of this important subject.

In succeeding pages will be found reviews of the progress of some branches of medicine during the past year, and a careful perusal of these articles will demonstrate that the profession of medicine is making rapid strides toward perfection.

NOTES ON THE STATUS OF SURGERY IN 1912.

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No epoch making strides have been made in surgery within the past year. Progress along this line has consisted mainly of extension of and technical improvements in methods and procedures practiced or at least suggested, prior to 1912.

The necessary limitations of an article of this sort on so broad a subject make it, at best, but fragmentary and incomplete but an attempt will be made to at least outline the trend of events in a few of the most important fields of surgical endeavor.

If any one branch of surgery has occupied the "centre of the stage" more than another during the last, in common with the few preceding years, it has probably been that of bones. Reconstruction of shafts by grafts and of joints by interarticular fibrous or fatty flaps and internal fixation by means of plates, nails, dowels and grafts have been the order of the day. The lectures of Murphy, delivered in numerous parts of the land, have done much to familiarize the profession with the underlying principles of bone repair.

Among the numerous examples reported by Murphy[1] are two which a few years ago would have seemed miraculous. These were respectively of the head of a humerus and that of a femur which had become necrotic, but yet remained aseptic, through fracture separation from their shafts, and were retained, nailed to the shaft in each instance and acted as bone grafts, for complete reconstruction of a new head in each case, as was shown by serial skiagrams, as well as the final perfect functional result.

Murphy's belief is that living bone grafts as well as these dead ones act as a temporary scaffolding for the transporting of osteogenetic elements over from the living bone, with which they are in contact at one or both ends, and that having served that purpose they are eventually absorbed, leaving an entirely new bone in their place. Others, among them Albee, believe that living bone grafts, which of course are generally used, retain their vitality and become incorporated with the additional material which they carry over. Whichever theory one accepts, the fact remains that bone grafts of greater or less length (Murphy reports a case where one 7½ inches long was used to regenerate the upper end of the humerus) may be successfully employed to bridge over defects produced either by trauma or disease.

The essentials insisted on are contact at one or both ends of the graft with living osteogenetic elements and asepsis. A graft may be used to regenerate an articular end of bone with contact to osteogenetic elements only at one end, the other being placed within the joint capsule to be refilled, which is done to such an extent that tuberosities for muscular attachments are reformed almost or quite after the original pattern—at any rate sufficiently a duplicate for all functional purposes.

Murphy believes from his success in the two cases referred to of regeneration of heads of humerus and femur, where they were already dead but aseptic, that an aseptic dead bone head taken from a cadaver may be used for the same purpose, but has not yet demonstrated the fact in practice. It seems logical that such a bone fragment, preserved, *a la* Carrel, might be successfully employed.

An interesting fact put forth by Murphy is that even when a slender graft—as from the anterior tibial margin is used to reconstruct the loss of the entire thickness of the shaft of such a bone as the humerus or femur, the new bone increases to such a size as is necessary to give the support required by nature in the extremity in which it has been placed.

Murphy has also found that when a sequestrum has been removed as in osteomyelitis, and the periosteum has been preserved, a column of magnesium, ⅛ to ½ inch in diameter, may be inserted in lieu of a bone graft—like the graft in contact with living bone at both ends. An involucrum of new bone is formed around it from the periosteum and the magnesium is usually dissolved and disappears with evolution of hydrogen gas. If it is not dissolved the process is hastened by injection of carbonated water, weak alkaline, or mineral acid solutions 1 to 5%.

An ingenious use of the bone graft has been introduced by Albee for the cure of Potts disease. His plan is to expose the tips of the spinous processes of the affected vertebrae and of one or two next aboye and below, split each process, vertically, nearly to its base, thus making a groove or trough, into which he transplants a narrow strip of bone of requisite length, taken from the anterior margin of the patient's tibia (autografts are preferable for all purposes) and over it closes the soft parts divided in the exposure of the spines. Thus he establishes a permanent internal splint in place of the previously used external splints or jackets of one sort or another, and as fixation or immobilization of the affected vertebrae is the *sine qua non* of treatment in Potts disease the result is successful.

Hibbs[2] establishes an internal fixation in a different manner, by breaking down the spinous processes of the affected vertebrae along with at least one above and below, so that they overlap, also partially separates a splinter of the lower border of the lamina on each side and bends it down on the upper border of the lamina below. Over this network of spines and splinters of laminae he closes the periosteum and soft parts that have previously been reflected and the result is a fusion or amalgamation of the several diseased vertebrae along with a sound one above and below with resultant fixation.

Both of these ingenious and logical procedures were either suggested or practiced by their authors in 1911, but the present year has seen them firmly established by sufficiently numerous operations and end results to prove their value and, like many other important discoveries and inventions, they are such obvious improvements on older methods, and withal so simple, that one naturally wonders that they were not devised and adopted long before. The explanation evidently is that they had to wait for the inspiration of what may fittingly be termed the osteoplastic era.

In the management of certain difficult fractures, internal fixation, especially by steel plates and to some extent by nailing continues to grow in favor. Lane gave some beautiful demonstrations of his technic in bone plating during his visit to the Clinical Congress of Surgeons in New York. A large element in his success is explained when one sees the scrupulous nicety of his aseptic precautions, for instance allowing nothing but instruments (not even the gloved fingers) to touch any part of the wound; using no instrument a second time until it has been cleansed in a sterile solution and insisting that assistants shall pass his instruments with thumb forceps and sterile gauze, instead of with gloved hands. Such details may seem fussy to some but it is evident that one cannot guard too strictly against sepsis in bone surgery.

There is still some diversity of opinion as to the frequency with which internal fixation, or in fact any open method in fractures should be employed. A "safe and sane" statement of the situation seems to have been made by Darrach[3] who, in speaking of the merits of open and closed methods of reducing recent fractures (or dislocations) says, "The indications for operating may be stated thus: If a satisfactory reduction cannot be both obtained and maintained by the closed method, the fracture or dislocation should be operated on, there being no further contraindication. A satisfactory reduction does not necessarily mean a perfect anatomic alignment—but may be defined as one in which the increase in the range of motion and the decrease of deformity to be gained by the open method do not warrant the risk of operation."

"My routine," he says, "has been never to operate except in self-evident cases, such as patellas and olecranons, until two conscientious efforts have been made to obtain a closed reduction under ether. But some day I hope to be skillful enough to tell in advance by a gentle manipulation and a good x-ray whether it is worth while attempting this. For too often we see at operations the ravages in the soft parts our heroic attempts at reduction have made, with the destruction of the precious notching and dentition of the fractured ends."

Furthermore, he asks: "When is the best time to operate?" and answers: "After the body has had time to catch its breath following the original injury. After the bleeding has stopped, the coffer-damming commenced and a good healthy separative action begun,—but before the muscles have become set, the exudate around the broken ends begun to harden and our clean cut margino rounded off. Avoid too early operation and save the body a second trauma too soon. Avoid too late attempts in order to prevent a more difficult operation and bad end-results. Somewhere between the fifth and eighteenth day seems the best time, preferably before the tenth." He adds, "After obtaining reduction as simple and as little foreign material should be left in the wound as need be—no appliance if possible, chromic catgut if necessary and plates and wires when they are really required."

Of fifty-three fractures reduced by the open method he says: "No appliance was used in twenty-one, simple suture in seventeen, wire in two and plates in sixteen with one aluminum dowel."

This author says further that his end results have been much better in recent than in late operative cases because of the greater trauma necessary to obtain a good reduction and the more frequent need of some internal fixation in the latter. He gives 104 as the num-

ber of fractures operated on in the Roosevelt Hospital Emergency Ward out of a total of 2,100 fracture patients in the past two years and regards this proportion (5%) as a fair indication of the frequency with which the procedure is indicated.

The question of how to deal with a fracture which is from its beginning, already open (in other words compound fractures) perhaps deserves some special attention. Lane condemns the use of plates in compound fractures known to be infected. Murphy[4], regarding all compound fractures as potentially infected, advises against the immediate use of metal plates or any such foreign body, but treats the soft parts with a view to preventing or overcoming infection and when that result seems to be attained (an average of about 3 weeks) if other means of obtaining and maintaining apposition and alignment have failed he applies plates or some other method of internal fixation.

In spite, however, of the opinion of so high an authority, there is no doubt that many good surgeons have found that by a liberal use of iodine in compound fractures followed by suitable temporary drainage, it is possible to do immediate plating of compound fractures with excellent results.

The internal fixation of demonstrably infected compound fractures is, of course, a very different matter, and yet Bartlett has reported a series of 3 such cases where a plate was applied with resultant good union and the writer has had one recent case of badly infected compound fracture of the surgical neck of the humerus, first seen on the 10th day, in which there seemed no other way of maintaining apposition and alignment of the short upper fragment (in face of the necessary frequent drainage) than to apply a plate—which was done—with good union after a period of two months and excellent functional result, although of course the plate required removal as soon as union was firm enough to permit it.

It would seem that while such practice is as a rule, to be condemned, yet there are exceptional cases, where, if apposition and alignment are otherwise impossible, one is justified in taking a chance, even with demonstrably infected compound fractures, and applying a plate after free use of iodine and with enough drainage to prevent retention of wound secretions.

An ingenious suggestion is made by Lilienthal[5] for fixating infected fractures without the introduction of a foreign body into the actual line of fracture. Four gimlets are driven into the bones—two at a little distance from each fractured end, through the soft parts—purposely staggering them somewhat instead of placing them in a straight line. The gimlets have no handles but square heads to fit a key which is used to drive them in. Two slender steel rods are then placed so as to contact with all the gimlet heads and fastened in position by plaster bandages. When the plaster is set, supposing the fragments to have been placed in apposition and alignment, the whole is secured as firmly as by an internal fixation. Dressings can easily be applied underneath the steel and plaster bridge and the gimlets can readily be removed with the key when they have served their purpose.

The same article also describes a modified form of steel plate which facilitates removal, and it would seem to be indicated in those cases where infection and subsequent removal of the plate is apprehended.

Gerster[6] describes two new and apparently useful mechanisms for the distension, or longitudinal separation of fractures with considerable overriding, in which reduction is often so difficult and accompanied, not infrequently, by severe traumatism of the parts in its accomplishment. Inasmuch as the proper comprehension of these devices of Lilienthal and Gerster is so greatly aided by the accompanying illustrations, as well as the complete text, a careful perusal of the original articles is recommended to those interested in bone surgery.

In a recent article, Cotton[7] makes a logical argument regarding the frequent occurrence, under certain conditions of non-union in joint fractures. He claims that the presence of synovial fluid between the broken ends tends to prevent clotting and consequent callus formation. To quote his words: "I believe that the solution of the matter of union in joint fractures is to exclude synovial fluid and to ensure callus by securing contact. The impacted hip fracture unites, and if we impact the fragments of a loose broken hip artificially, or drive them together by the forgotten technic of Senn or by Whitman's abduction method, we get union, because we get contact. Suture a broken patella with sundered fragments and it unites, because we get contact. A patellar fracture without separation unites because we already have contact of the broken surfaces. In all of these cases the synovial fluid is excluded from the mutual contact of the broken surfaces."

In old hip fractures without union we operate and whether we spike or pin, or merely put up the joint with traction, with or without abduction, we uniformly get union, sometimes only fibrous to be sure, but always a union of sorts."

"Given almost uniform good results by any technic, what is the common factor of success pertaining to all the procedure alike? My answer is, opening the joint, for no hip joint is ever adequately closed after operating. With the joint drained into the tissues, the bar to callus formation is removed. That, in my belief (with a reasonable fixation added) is the whole story." Surely an attractive theory and one supported by many facts.

Undoubtedly the greatest interest in the field of abdominal surgery, in the past year centers, as in the two or three preceding, about the various surgical procedures calculated to overcome intestinal stasis. Lane in his masterly address before the Clinical Congress, spoke enthusiastically about the logic of his contention that the colon is a cess-pool, which, if stagnant, results in general systemic poisoning, and the removal of which, or its short circuiting, clears up many and divers seemingly unconnected pathologic conditions even to the curing of tuberculosis, nephritis and goitre. Lane lays great stress on establishing the diagnosis of colonic stasis as well as stasis in other portions of the gastro intestinal tract by following the course of a bismuth meal throughout the canal by means of serial radiographs.

Bevan[8], on the other hand warns against the extreme views of Lane on constipation—and Wilms on the effects of so-called Mobile Cecum. He says: "Let us wipe off the slate of legitimate surgical procedures Lane's operations for chronic constipation, and Wilm's anchoring of a movable cecum. The trouble is that here and there all over the world credulous surgeons have accepted Lane's and Wilm's views and are removing colons and stitching up supposed mobile cecums to the great detriment of their patients."

Bevan believes that the prime factor in dilated large bowel calling for surgical procedure is pericolitis with formation of adventitious bands or adhesions—especially in four favorite locations "(1) about the cecum and appendix (2) at the hepatic flexure (3) at the splenic flexure (4) about the sigmoid; that the whole subject is yet too new to permit definite valuation of the various measures advocated, but that we might tentatively adopt the following scheme:

1. In minor cases, simple division of adhesions and protecting the raw surfaces by normal peritoneum.

2. When cecum and ascending colon are extensively involved, make a lateral anastomosis between ileum and transverse colon.

3. When obstruction exists at the splenic flexure, make an anastomosis between transverse and descending colon or transverse colon and sigmoid.

4. If the obstruction is in the sigmoid, make a resection of the sigmoid and lateral anastomosis. But an anchoring of the cecum because it is movable or a resection of the entire colon for constipation *never.*"

Bloodgood[9] draws some original and practical conclusions regarding "Dilation of the Duodenum in Relation to Surgery of the Stomach and Colon." He speaks of three pathologic conditions coming under this head.

"1. Dilatation associated with acute dilatation of the stomach—gastromesenteric ileus—often met with in convalescence from acute infective diseases as well as in post-operative conditions. The stomach tube is usually effective here but operative relief may become imperative.

2. Chronic dilatation of the duodenum due to an obstruction in the terminal portion of that section of gut through a drag on the mesentery by a dilated and loaded cecum displaced into the pelvis." "Resection of the right half of the colon," he says, has proved, in his hands, a cure for the condition.

"3. Dilatation of the duodenum after resection of the stomach with gastro-enterostomy of some kind. The gastric end of the duodenum being closed if any obstruction takes place at the site of gastro-enterostomy the contents of the duodenum cannot pass into either the stomach or jejum; the patient exhibits symptoms of shock or toxemia with tachycardia and anuria and dies within a few days." He has observed but two cases but is inclined to the opinion that some of the deaths reported in the literature as of post-operative shock, anuria or dilatation of the stomach were really due to dilatation of the duodenum closed at both ends. While there is temporary or complete relief from washing out the stomach in the first two conditions, gastric lavage will not relieve the third type at all. It should be prevented, if possible, by proper technic of the gastro-enterostomy, but if in spite of care it does occur, must be relieved by temporary operative drainage of the duodenum.

Coffey[10] has presented an illuminating article on Gastro-Intestinal Stasis. It deals largely with the fundamental principles underlying that condition, excluding such causes as stricture and ulceration. The discussion covers so wide a field, enters so profoundly into anatomic and embryologic factors and withal is so dependent for a thorough comprehension of its arguments on the many very excellent illustrations, that it is impossible to present a satisfactory abstract within these limits. A perusal of the paper, in its entirety, may, however, be highly recommended, to all who are interested in the subject considered.

Another excellent paper along somewhat similar lines, but treated from a different standpoint is by Rovsing. Its voluminousness precludes an attempt at abstracting, but it is well worth a reading.

W. J. Mayo[12] contributes a valuable article on the "Radical Operation for the Relief of Cancer of the Rectum and Recto-sigmoid." He recommends primary colostomy with secondary posterior resection. Thirteen perfect results were obtained by him in thirty cases dones in that way by two stages. He states that the two most important factors in his recent results are first; Elimination, by means of a preliminary abdominal operation, of those cases of abdominal metastasis which would, otherwise, be subjected to useless operation, and second, the acceptance by the patient, of permanent colostomy, either sacral or abdominal, as a necessary evil in the majority of cases, and says, in conclusion: "We are to-day operating upon cases which three years ago we would have considered entirely beyond the reach of surgery, because experience has shown that cancer of the rectum long remains a local disease and, by block dissection, cures can be obtained in a goodly percentage of cases."

The year has produced some suggestions for so controlling hemorrhage (the factor most to be feared) in operations on the liver, that the field of operative work upon that organ would seem to be considerably extended. McDill[13] shows how the entire liver circulation may be controlled by the pressure of rubber shod enterostomy clamp introduced through a small incision an inch below the costal border in the midaxillary line and, with one blade in the foramen of Winslow and one above the edge of the gastro-hepatic ligament, made to grasp the hepatic artery and portal vein. Experiments on dogs show that such pressure may be safely kept up for 20 or 30 minutes. Of course it can be applied and relaxed at will. In this way he says that resections of the liver may be done, limited to primary, or closely grouped accessible conditions and that size may be no contraindication, unless too near the portal vein or hepatic artery.

He also advises against chloroform as an anesthetic in all liver operations, on account of the danger of sudden fatty degeneration and of necrosis with hemorrhage, due to elimination of fibrinogen by the chloroform—fibrinogen being formed wholly in the liver or else is dependent wholly on liver activity for its production.

Freeman[14] recommends controlling the circulation while removing localized liver growths by gauze compression. He plunges a long-jawed forceps through the liver substance and pulls through double gauze strips, repeating this about the area to be excised so as to surround it—cuts the folded ends of such strips and unites them by catgut. The free ends of the gauze emerging from the upper surface of the liver are then tied tightly and brought out of the wound. This control of the circulation permits of excision of the surrounded part and after a few days, when the catgut has absorbed, the gauze may be removed.

He also suggests a modification of the same principle for enabling one to remove the tongue shaped processes or growths, by passing doubled catgut strands through the liver at the base of the growth so that the loops are all on one side, the free ends on the other. A wire is then passed through the loops and the end brought outside; another is laid on the opposite surface between the free ends in the same manner and the ends of catgut tied tightly over it, thus controlling the circulation. The growth is then removed and later when the danger of hemorrhage is past the wires are removed by traction on their projecting ends. The advantages of this method over the use of pressure clamps are that the wires adapt themselves to irregularity of surface, cannot slip and do not crush, but only compress the liver substance.

Martin in a paper read at the Surgical Congress, describes a liver needle without cutting edges and with a vertical thread cut in the end, in place of an eye. This permits of a catgut end being screwed, as it were, into it, so as to be continuous with the needle and to follow it without danger of tearing the friable tissue.

This would seem to facilitate the passing of sutures and ligatures in the liver substance. Martin also recommends a U shaped or fish hook incision passing down the median line from the ensiform to the linea transversalis next above the umbilicus and thence outward and upward, as not only giving better access in extensive liver operations but also as avoiding injury to the nerve supply of the muscles in that region.

Sullivan[15] has presented a method of reconstructing the common bile duct in cases when extensive disease has resulted in destruction of that channel. His plan is to insert one end of a soft rubber tube, a half inch, into the hepatic duct and then carry the other end through the stump of the common duct, if possible, or if not, through a small incision in the anterior wall of the duodenum so that it projects, in either case, about a half inch into the duodenal lumen. Both ends of the tube are anchored by non-absorbable sutures and the duodenum cuffed up about the distal end for a distance of 2 cm., *a la* Witzel gastrostomy. The tube is then anchored at several places to the duodenum and gastrophepatic omentum with the idea of holding it permanently in place, although experiments show that even with non-absorbable suturing the tube will eventually drag through into the bowels. After the tube is fixated as described a suitable piece of omentum is grafted over it so as to cover it in. Experiments have shown that after the extrusion of the tube a competent biliary passage—in other words a new common duct—is left.

In line with hepatic surgery are two recent suggestions for auto drainage of ascitic fluid in cirrhosis of the liver—one the use of silver wire bent into an H shape—one arm long and the other short. The long arm of the H is implanted within the abdominal wall while the short arm is left inside the peritoneal cavity—thus keeping open a channel for drainage of the peritoneal fluid into the cellular tissues of the abdominal wall where they are, hopefully, absorbed.

The second scheme by Babler,[16] is a modified omentopexy, carried out by lifting both recti out of their sheaths, through a median incision and posterior dissection from within outward. With both recti thus widely retracted a transverse incision is made across the fascia transversalis abdominis and peritoneum constituting the posterior sheath and through this slit a liberal flap of omentum is drawn out and implanted into the space posterior to the recti, torsion of the omentum being prevented by a few interrupted sutures around its edges while a hernia is guarded against by stitching the omentum to both the upper and lower lips of the peritoneal incision. While the principle of thus establishing a collateral portal circulation is not new, the details of this particular technic seem to be original.

Among the suggestions as to surgical technic in the abdominal region may be mentioned one by the writer[17], of a modification of Maunsell's method of intestinal anastomosis—the modification consisting of substituting a continuous interlocked suture for uniting the invaginated intestinal ends in place of the interrupted sutures hitherto applied in that technic. There are some inherent objections to the use of interrupted sutures in such an operation but the continuous, over hand, interlocked suture applied to Maunsell's method of invaginating the open ends of a resection transform the old Maunsel operation into a very safe and expeditious one.

Buchanan[18] seems to have devised a valuable modification of Bartlett's gastro-enterostomy clamp and, as thus modified, the instrument appears to have decided advantages over the other forms of clamps for this purpose.

The past year has offered nothing fundamentally new in intrathoracic surgery, for the essentials to successful performance of that work (pressure-differential and intratrachial insufflation methods of anesthesia) were already in practice. Advance has been largely along the lines of improved surgical technic. Flint[19] presented a valuable paper on the "Physiologic Basis of Thoracic Surgery," based on a series of animal experiments. Among his conclusions is the fact that, in animals at least, little of what we term surgical shock seems to follow operative traumatism on the contents of the thoracic cavity. In a number of instances the animal, after a total pneumectomy, crushing of one phrenic, pericardiotomy, and suture of a stab wound of the heart showed a blood pressure of but 15 or 20 mm. below that at the beginning of the experiment. On the other hand, operations on human beings, in the field of thoracic surgery have frequently been followed by relatively severe surgical shock, so there is probably a difference in reaction on the part of organs that are apparently healthy and those that are diseased.

Another conclusion is that there is a definite parallel between the mechanical stimulation of the parietal peritoneum and the parietal pleura, as tearing the pleura by injudicious application of the rib-spreader is frequently followed by profound shock. On the other hand, manipulations that tend to transmit traction to the great vessels and bronchi at the root of the lung result in severe disturbances in respiration, pulse rate and blood-pressure and should be reduced to a minimum.

His experiments throw no conclusive light on the relative value of the methods of maintaining anesthesia during surgical operations with an open pneumothorax. Both insufflation and pressure differential do the work well and each appears to have points of superiority.

It seems to be more difficult to maintain the normal character of the pulse, blood-pressure and respiratory curves with insufflation than with pressure-differential; but the variations are not sufficient to jeopardize life. Insufflation, on the other hand, keeps the air passages free of secretions and there is no difficulty with the tongue nor with vomiting.

In heart suture the author found that a vague type of pulse is accentuated by the tension of traction sutures used for temporary hemostasis but this soon recovers itself. He, however, advises against Sauerbruch's method of temporary hemostasis by clamping the great vessels at the base of the heart between the fingers (as it causes too serious a fall of blood-pressure) except when other measures of hemostasis fail.

If animal experimentation is any guide to the possibilities of surgical accomplishments on human beings (and it certainly must have some value as an index), the results reported by Boothby[20], in intra thoracic arteriorrhaphy encourage one to hope for ultimate wonders in the surgical treatment of thoracic aneurysm. He has divided and sutured the thoracic aorta six times, four of which operations on animals were successful. The deaths were due to obstruction of the lumen by unsuccessful attempts to close large tears caused by the stay sutures. In one case of recovery the thoracic duct was injured and leaked profusely, indicating a probably unknown collateral lymph circulation.

In connection with arteriorrhaphy, Horsley[21] has devised a simple and practical instrument which aids materially in the performance of this delicate technic. It can best be understood by reading Horsley's article in connection with the illustrations.

Arteriorrhaphy naturally suggests the name of Carrel and this outline would be worse than incomplete if no reference were made to the crowning of his efforts by the granting to him during the past year of the Nobel prize. His paper[22] read at the last session of the A. M. A. gives a brief resume of his successful efforts in preserving many of the tissues and organs of the body more or less indefinitely by means of suitable media and low temperatures, and of making these tissues and organs do duty again in another organism.

Among all the modern marvels of biological and surgical effort it would seem that this work is easily the most wonderful and although it is yet too early for general application of Carrel's discoveries to have been made in many cases of human surgery it will be strange if we are not on the threshold of startling surgical accomplishments as a consequence of his genius.

The writer cannot resist the temptation to add to an already over lengthy presentation of the subject under consideration by calling attention to the efforts of Haynes[23] and Kopetzky[24] to successfully attack meningitis (of all forms but more especially of the septic type) by a well planned *early* surgical procedure. The comprehensive papers published by these enthusiasts must be read to be appreciated. An abstract cannot do them justice. Suffice it to say that their argument in brief is that meningitis kills, in the last analysis, by cerebral pressure, that we have no effective weapon against it except the Flexner serum, which is only available in the diplococcic form, and not always then, and that the rational treatment of all cases is an early relief of intra cranial pressure by drainage of the cisterna magna, the largest, lowest, most posterior and most accessible of the subarachnoid spaces, having a communication with the various other subarachnoid spaces of the cerebrum and spinal cord as well as the fourth ventricle. The technic of the operation has been devised and practiced by Haynes and appeals to good surgical judgment although the few cases so far reported by him were unsuccessful in saving life, presumably because not operated sufficiently early. If a diagnosis can be made before general septic involvement of the encephalon has taken place it would mean that a courageous and skillful operator might save such cases by a drainage operation of this sort.

In conclusion one may note that the greatest single enabling factor in modern surgery—anesthesia—has continued to keep pace with the march of progress.

Gwathmey[25] presents a valuable article on "American Statistics of Anesthesia." The older statistics do not take into consideration such elements as moisture, heat and oxygen as well as the various sequences or combinations which are important factors in present day anesthesia; hence the desirability of up-to-date records which Gwathmey has endeavored to collect, with a considerable degree of success, although lack of hospital records or indifference of hospital authorities prevented his securing as comprehensive data as could have been desired, replies coming from ninety-nine hospitals, including the Army and Navy reports, the total number of administrations represented being 278,945, a comparatively small number as against Hewitt's total of 1,000,000 administrations in foreign lands.

Gwathmey's table shows the four principle methods in order of their frequency of use to be 1. Ether, drop or vapor; 2, nitrous oxide-ether sequence; 3, chloroform, drop or vapor; 4, chloroform- ether sequence. The relative safety of chloroform and ether is borne out, the latter being about two and one-half times as safe as the former. The statistics show that the chloroform-ether sequence is safer than the gas-ether sequence—or ether by the drop method. Among general (inhalation) anesthetics in extensive use represented in this table nitrous oxide with oxygen stands pre-eminent as to safety, 8,585 administrations with no deaths. Anesthol (a chemical combination of ethyl chloride, chloroform and ether), has a record of 6,139 administrations with one death, thus leading ether by the drop method, which has an average of one death for 5,623 administrations, but Gwathmey regards the proper sphere of anesthol to be as a preliminary to ether. He recommends that those using the drop method of ether should improve their technic and results by: 1, a preliminary medication of morphine and atropin or some similar drug combination. 2. Commencing the anesthesia with two to four drops of essence of orange (25% U. S. P.). 3. The drop method of anesthol until the patient reaches surgical anesthesia and then a change to the drop method of ether. 4. Replacing the drop method of anesthesia by some form of vapor anesthesia.

The orange essence—ether sequence suggested recently by Woolsey[26] and elaborated by Gwathmey, is a distinctly new addition to the anesthetist's armamentarium. It masks the unpleasant odor of the anesthetic and lessens or entirely obviates the stage of excitement. While Gwathmey's statistics make no mention of intravenous aesthesia he has personally expressed his opinion to the writer that it bids fair to eventually replace inhalation anesthesia. So far, hedonal has been mainly employed in that field, but ether (usually in 5% mixture with normal saline) seems equally effective and safe. The patient is usually under the full effect in two and one-half minutes and the recovery is smooth. A popular misapprehension is that a pre-determined dose is used once for all, as in spinal analgesia, but the fact is that it is introduced into the venous current more or less continuously (or intermittently) as the situation indicates. The chief limitation of the length of anesthesia by this method is an overfilling of the circulation by saline, so that one hour is about the maximum of time for continuous administration—which is on a plan similar to that of the "Murphy drip."

The newest development of *local* anesthesia is its employment in so called "Anoci-Association" anesthesia (Crile)[27], Anoci-Association being a newly coined expression which means free from or without noxious associations. This ingenious and logical method of Crile's has for its foundation the theory (supported by facts) that while inhalation anesthesia puts the conscious cerebral centers asleep there are many unconscious (sub-conscious) centers which remain awake and in responding to the various stimuli of operative traumatism become exhausted—with resultant shock.

Crile proposes to eliminate all this by blocking off all these efferent impulses, through the injection of one-fourth per cent. novocain into the skin before it is incised and again repeatedly into each plane of tissues as the operation proceeds. In abdominal operations, especially, the novocain is reinforced and its action made more permanent by injecting a one-half per cent. solution of quinine and urea hydrochloride into the parietal peritoneum before the incision is closed.

Crile's idea of anoci-association goes beyond the addition of local to inhalation anesthesia and includes all those legitimate methods of favorably impressing the patient's psychic state before coming to operation and his results since he has employed this method seem to justify his confidence in the plan.

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RECENT ADVANCES IN NEURAL SURGERY.

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The surgery of the nervous system is steadily advancing in its scope, especially in the directions of traumatic surgery, the surgery of tumors, and operations for epilepsy and for the relief of pain. Operations for spastic conditions and operations upon the hypophysis now have a literature all their own. Meningitis now promises to take a place as a subject for surgery.

The most conspicuous advancement for the year in neural surgery is unquestionably to be found in Cushing's work, "The Pituitary Body and Its Diseases." It presents not only a summary of what he has contributed to the subject but a summary of what others have contributed. The most valuable feature of the book, however, is its high scientific tone. The author employs the infranasal route proposed by Kanaval. This operation seems destined to become the standard one.

Operations for Brain Tumors. The casuistic literature appearing during the year has been enriched by a number of papers, each reporting a few cases. In addition there have been two papers presenting an extended series of cases from two operators. Taylor (*Ann. Surg.*, 1912, lvi, 55) reports on 63 cases operated upon by Keen and himself. He emphasizes the fact that most of the cases in the literature were reported too soon after operation to be of value in determining the final results in the surgery of brain tumors. He is able to report one patient operated upon by Keen alive and well after 20 years. There were two other cases that lived as long as 6 years, but only one of these is now living. All other cases died within three years after operation. This author believes that unless the location of the tumor is very evident the tissues of the brain should not be damaged in the effort to find it. In his list are 6 tumors of the dura. Three of these patients died within a few hours from hemorrhage. One is the patient above noted as being alive after 20 years. One died after 108 days from recurrence, which was an unusually rapid recurrence for that variety of tumor—an endothelioma. The third was well after 3 months when lost track of. There were eight cysts, 4 cerebellar, 4 cerebral. Six of these recovered by simple drainage. One is still alive after 5½ years. In 33 of the 63 patients treated, tumors could not be found at operation. In 30 a tumor was removed. In 14 the tumor was wholly removed, in 9 partly, and 8 were cysts. Six died within the first 5 days, 13 within 10 days. There were 19 deaths in the 63 cases—30%. The results cause the author to assume a very conservative view well calculated to stay the hand of the novice.

Von Eiseleberg's results (*Wien klin. woch.*, 1912, xxv, 17), while no more brilliant, cause him to view the prospects rather more hopefully. He reports on 100 cases. Forty-three cases of cerebral tumors were operated. Of these 32 cases were correctly diagnosed as against 11 errors. Of 22 cerebellar tumors there were 11 correct diagnoses and 11 errors. Of the 43 cerebral cases 24 were in the region of the central convolutions, 5 in the frontal region, 3 in the region of the gyrus angularis, and in 11 the tumor was not found at operation. Of the 11 cerebellar tumors correctly diagnosed 5 were removed. Of the 11 cases in which no tumor was found 8 died from the operation. Of the 77 cases operated, exclusive of the hypophysis tumors, 32 died from the operation. Of these 22 died of shock, 6 from infection, 3 from pneumonia and 1 from embolism. Of the patients who recovered from the operation 12 are alive; of these 3 are well after 5, 4 and 2 years respectively. The remainder vary from 2 weeks to 17 months. Of this list it will be noted but two are alive after 3 years the limit placed by Tigler. These results as well as the mortality correspond almost exactly with the results as detailed by Taylor and may be accepted as the most favorable results obtainable in the best hands. Obviously operation for brain tumors is not a very suitable diversion for amateurs.

Hayner (*Laryngoscope*, 1912, xxii, 865), in an elaborate paper accompanied by an extensive bibliography, presents the claims for surgery in the treatment of purulent meningitis. The cisterna magna he believes is the most promising region for drainage. Nothing of note can be said to have been accomplished in the surgical treatment of meningitis. While analogous somewhat to suppurative processes in the abdominal cavity, yet there are important differences that are fundamental and the advances in meningitis must come, as they have come in purulent affections in the abdomen, in earlier diagnosis. The fundamental difference will always exist, that only those meningitides which are caused by infection by extension are comparable to abdominal infections. The whole class of hematogenous meningeal affections are without analogous conditions in the abdomen unless one recognizes idiopathic peritonitis. There is nothing in the field of operative surgery to give hope that this type of cranial diseases will ever be amenable to surgical treatment. If they ever do come into the range of the operative surgeon new fundamental principles will need to be developed.

Epilepsy. The end results in epilepsy, as in operations for brain tumors, are just a little better than absolutely discouraging. The literature for the year has brought forth a few authoritative papers which do much to define the limits of surgery in this disease. Frazier (*Therap. Gazette*, 1912, xxxvii, 171) reports the end results in 63 cases. In these cysts were found in 8, adhesions in 6, pachymeningitis, with adhesions edema or cysts in 13, edema alone in 11, edema with cysts in 1,

cystic degeneration of tumors in 2, cortical gliosis in 2. As pachymeningitis he defines a condition in which there is an opaque appearance of the membranes confined to the course of the vessels and to the sulci between the convolutions. The condition, according to Aim, is due to an exudate of traumatic or inflammatory origin. In 53 cases there was history of traumatism in 27. If there is history of trauma and no evidence of it (scars, depressions, etc.) there should be a careful examination into the history as to what transpired immediately after the accident. Unconsciousness, convulsions, persistent headache or transitory paralysis should be particularly inquired into. Operations should be confined (this author believes) to Jacksonian epilepsy and general epilepsy in which there are symptoms indicating a focal lesion. In cases without a focal lesion the only possible operation is a Hartley cortical excision or a Kocher decompression. In cases without gross lesion the author pricks the pia at various points and leaves a part of the dura unsutured. The results in 25 cases were that beyond the three year limit, 7 (28%) were favorably influenced by operation. Taylor (*Therap. Gazette*, 1912, xxxvi, 164) limits the operative indications to cases in which there is distinct evidence of traumatism producing scar or depression or a persistent headache following the injury. In idiopathic cases without local onset no operation should be done. In idiopathic cases with local symptoms operation should be done with the hope of finding a cyst, a new growth or localized inflammation. In all instances the dura must be opened and the brain exposed to sight and touch. He does not sanction the excision of cortical substance unless there is distinct evidence of disease. In all instances an osteoplastic flap should be made permitting of wide exploration.

Collier (*N. Y. State Jour. Med.*, 1912, xii, 633) calls attention to the fact that surgery may do injury to epileptic patients. To be beneficial it must be done early. Spinal puncture, he states, is beneficial in status epilepticus. Sleddon (*Jour. Tenn. Med. Assn.*, 1912, v, 26) reports a brilliant result after raising a depressed inner table. Munson (*N. Y. State Jour. of Med.*, 1912, xii, 636) reports a series of autopsies on patients who had been operated for epilepsy. He emphasizes the need of so operating that the minimum of scar tissue is produced. If this is not done the scar tissue formed may cause as much mischief as the tissue removed. In traumatic cases he states the operation should be done before epilepsy develops. Rather discouraging for the surgical outlook is the statement that in 375 autopsies very few showed anything that could have been removed by operation not surgical even with limitless surgical acumen. The authors above quoted are a unit against Horsley's idea of cortical excision. Doberer (*Wien Klin. Woch.*, 1912, xxv, 370) opposes the other old theory of interest to surgeons—the excessive blood pressure theory of Kocher. This author operates by making a cross incision in the dura and tucking the corners under the surrounding margin of bone. Of 5 cases thus operated one was cured. Vogt (*Berlin Klin. Woch.*, 1912, xli, 575) takes a broad view, pointing out that epilepsy really is not a disease but a group of diseases inasmuch as some are metabolic, some syphilis or tuberculosis, and some depend upon a local lesion. The most extensive statistical paper is by Ito (*Deutsch. Zeit. f. Chir.*, 1912, cxv, 489). He reports on 106 cases operated during the years 1900-1911. Of these he was able to trace 53 operated more than 5 years. Eight were permanently cured, 15 were much benefited, and two died from the operation. The cured cases, it is worthy of note, were young in years and had no hereditary taint.

Decompression. This operation has had little added either to its indications or technic. Balance (*Brit. Med. Jour.*, 1912, ii, 698) calls attention to its indication in traumatic cases. He enumerates aside from hemorrhage in the new-born, fracture of the base, injury to a vein, to the vault and hemorrhage into the subcortical space. Anton (*Deutsch. Med. Woch.*, 1912 xxxviii, 254) has studied the causes of increased intracerebral pressure. Among the less commonly recognized causes may be mentioned hypertrophy and papilloma of the plexus, and tumors in the aqueduct of Sylvius. Increased pressure may simulate focal symptoms. Milligan (*Brit. Med. Jour.*, 1912, ii, 427) recommends decompression in intracranial complications of otitic origin as a corollary to the operation on the mastoid.

On the technical side of the decompression operation Hudson (*Ann. Surg.*, 1912, lv, 744) recommends on theoretical grounds a very extensive dislocation of the parietal region and presents a complete armamentarium for its accomplishment. McGuire (*N. Y. Med. Jour.*, 1912, xcvi, 1265) accepts the plausibility of Hudson's ideas and makes even bolder recommendations. From the description of the operation one would be disposed to believe that the patient would be relieved from their sufferings by the operation.

Auditory Nerve. Frazier (*Surg. Gyn. Obst.*, 1912, xv, 524) reports a case of section of the auditory nerve within the cranium for persistent aural vertigo. Operation is not indicated in vertigo of central origin but only to those which are labyrinthian in origin. The most promising are those in which there is loss of air conduction with preservation of bone conduction. Meyer (*Ann. Surg.*, 1912, lv, 323) reports a case of removal of fibrosarcoma of the auditory nerve. The longitudinal sinus was doubly ligated and the whole cerebellum thus mobilized. The tumor was then made accessible. Dench (*Interstate Med. Jour.*, 1912, xix, 29) reports section of the auditory nerve for persistent tinnitus. His patient obtained complete relief. He believes the operation justified when the annoyance from the tinnitus makes life a burden to the patient and is not remedied by other means.

Injury to the Vagus. Berard & Chalier (*Lyon Chirurg.*, 1912, viii, 461) reports 17 traumatic and 50 operative sections. Of the traumatic cases only 6 survived. In the operatively resected cases there was no great influence on the heart or respiration. Ligating or pulling on the nerve produces more influence than section. In syncope following irritation of the nerve it had best be sectioned. Kuttner (*Berliner Klin. Woch.*, 1912, xlix, 570) resected both vagi below the diaphragm after the technic of Exner for the crises in tabes. The patient was made worse. He regards the operation as wrong in principle inasmuch as the motor vagus is not at fault. To reach the seat of the trouble it would be necessary to get at the root between the medulla and jugular ganglion, according to him.

In Local Anesthesia, the contributions to nerve blocking have been few and only in modification of previous methods. Jassenetzky-Wolno (*Ztralbl. f. Chir.*, 1912, xxxix, 104) recommends as the best point to reach the sciatic the intersection of a horizontal through the tip of the great trochanter and a vertical line through the outer margin of the tuberosity of the ischium. It is at this point where the nerve emerges from the great sacrosciatic foramen. Hirschl (*Munch. Med. Woch.*, 1912, lix, 7218) recommends the blocking of the bra-

chial plexus in the axilla. He makes his injection at the lower border of the latissimus dorsi. The radial nerve is injected at this point. By pushing the needle up under the tendon of pectoralis major muscle the musculocutaneous and the axillary nerves may be reached. By infiltrating about the artery at this point the other nerves may be reached. He uses 30 to 40 Cc. of a 2% novocain solution with the addition of 5 drops of adrenalin solution.

Spinal Cord. Bottomly (*Boston Med. and Surg. Jour.*, 1912, clxvii, 691) expresses a tone of conservatism relative to operation in injuries to the spinal cord. Hemorrhage demands operation only when progressive. Partial lesions demand operation in certain instances only and then only after careful study. Fracture of the arch with depression demands operation when the presence of this lesion can be demonstrated. He denies that laminectomy is a harmless procedure. Elsberg (*J. A. M. A.*, 1912, lix, 1532) contributes a paper on technic of cord operation. Great delicacy is the keynote. If an intramedullary tumor is present the cord is incised down to it, and the tumor is allowed to extrude itself and removed at a later operation. The casuistic literature of cord tumors contains a number of additions indicating that rewards for careful work await workers in this field.

The total impression gained from a study of the year's literature is a more general recognition of the highly specialized character of neural surgery. Without special training any operative attempts in this field are destined to produce disappointment to the operator, disaster to the patient and discredit to this infant department of surgical endeavor.

PROGRESS IN NEUROLOGY AND NEUROSURGERY—1912.

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The past year has witnessed its full quota of contributions to the neurological literature detailing with observations and new experimental matter. As usual much of the matter has no permanent import for either the specialist or the general medical man. The comparative value of these contributions cannot at this time be accurately gauged. Those alone which are of real practical value in the diagnosis, prognosis and treatment of disease of the nervous system, functional and organic, will in time be permanently accepted. The aim of this short review is to offer to the general practitioner some of the essential and desirable things within the domain of neurology and to present the new material concisely without burdening the mind of the reader with controversial details or bibliographies.

No epoch-making discoveries are to be recorded from the field of neurological anatomy and physiology, but many minor additions have increased our knowledge. Perhaps the most important is the contribution to the study of neurogenesis by the cultivation of neural tissues in vitro. Since the original work of Harrison a few years ago with the cultivation of the tissues from the chick a number of workers have entered the field, whose output has resulted in many excellent achievements in the last year or two. The work and reports of Harrison, Burrows, Carrel, the Lewises and Marinesco and Minea are particularly striking. Tissues from the central nervous system of several warm-blooded animals were made to grow in specially prepared media under carefully guarded environments. These researches have at least corroborated some of the developmental and anatomical theories. The neuron theory is greatly strengthened by the observation that the neuroblasts have the power of motility, and that the processes always project from the cell and will continue to grow for a long distance if a suitable framework is provided. Thus probably all dendrites and neurites spring from the neuroblastic cell, which is the trophic center. Special staining methods applied to these young cultivated cells have brought out the neurofibrillar structure in the cell and its projections. A granular appearance has been described in some of the specimens. The worker reporting this granular structure failed to demonstrate that the granules could not have been Nissl bodies or products of degeneration. Neurofibrils could be followed clinging to the under surface of the coverslip. Nerve cells from the intestinal sympathetic and from the dorsal root ganglia have been cultivated. Here again it has been shown that axones and dendrites arise from the cells only and never from a preexisting network.

Some physiological experiments carried out have demonstrated that the conductivity of peripheral nerves is delayed when stovain, cocain and other anesthetics are applied.

Spinal cord anatomy and physiology has had no striking additions of practical value. Many case reports confirming tract functions have appeared during the past year.

The cerebellar tracts have been more accurately defined and additions to the localization of functions have been obtained from several difficult researches as well as from clinical and pathological data. It has been shown by Rossi that cortical cerebral response is diminished by excision of one-half of the opposite cerebellar cortex.

More than ever does the importance of the optic thalamus as a relay station for the reception of peripheral sensory stimuli appeal to the neurologist. The recent work tends to show that every sensory impression before being registered in the cerebral mantle passes through a neuron with its cell in the thalamus or in neighboring ganglionic centers, which have virtually the same function.

Cerebral localization has had additions from various sources. The cortical motor centers are now quite generally conceded to be located anterior to the Rolandic or central fissure. The post-central region is allotted to sensation and complexes of sensory phenomena. Speech localization has received slightly less attention. The contention of Marie, who a few years ago attempted to break down the prevailing theories of Broca and Wernicke, has not been accepted. According to the majority of neurologists motor speech is localized in the posterior third frontal convolution and auditory receptive speech in the first temporal convolution.

The toe phenomenon still continues an attractive field for writers. While new methods for eliciting the toe reflex appear, yet the original Babinski method remains the most certain and attractive. Several analogous signs in the upper extremity have been described, but do not carry the same weight as the toe phenomenon.

The voluminous subject of sensation has its full quota of writers, and justly so. The exhaustive researches of Head, begun on a grand scale some years ago, have contributed valuable technical data. Some new methods for making particular sensory tests and eliciting sensory complexes have been related. It is

probably true that many of the sensory phenomena described represent cortical complexes or multiple associations in the higher brain centers.

Many valuable contributions to neuro-pathology could be abstracted. Some of these will be given space under the corresponding disease headings. In connection with the many successful transplantation experiments of tumors into various organs it is interesting to read of the success of Fano in accomplishing the intracerebral transplantation of malignant tumors. Collins and Armour report the study of a case of hypernephroma with metastases to the brain and resultant Jacksonian seizures. Amyloid degeneration of brain substance in a case of general paralysis has been studied by Mignot. The pathological changes were marked in the smaller vessels of the brain. Claude has analyzed the changes which the blood undergoes when free in a hemorrhagic area of the brain. He concludes that there are three successive stages in the formation of pigment: (1) A dark brown pigment which gives no indication of iron by the prussian blue test; (2) a yellow amorphous iron pigment giving a prussian blue reaction; (3) a yellow crystaline pigment giving no iron reaction.

There continues to appear a large number of reports on the Wassermann test or one of its several modifications. The tendency among the numerous workers during the past year is to report a greater number of positive serodiagnostic tests in cases of syphilis of the nervous system. Especially is this noticeable in the parasyphilitic troubles. Marie has reported a case of Friedreich's ataxia where the Wassermann test was negative to both the blood serum and cerebrospinal fluid.

Studies of the cerebrospinal fluid have encouraged numerous articles and indicate a more frequent resort to this procedure for diagnostic as well as therapeutic purposes. Lumbar puncture is used for diagnostic as well as therapeutic aid in acute and chronic affections of the central nervous system. It is of the greatest value in syphilis. Some authorities contend that in syphilis of the central nervous system a Wassermann test with the use of blood serum is of less value than with cerebrospinal fluid. Recently it has been clearly pointed out that larger quantities of the spinal fluid must be used for this test, about four or five times the usual quantity. As an illustration, Schultze obtained a positive Wassermann reaction in only ten per cent. of his cases of tabes when using two-tenths c.cm. of spinal fluid; whereas by the use of 1.0 c.cm. of the fluid positive reactions were obtained in ninety per cent. of the cases.

Neisser-Pollack, or ventricular puncture, or Balkenstich, is probably more significant in the therapeutic rather than the diagnostic field. The real importance of these procedures will find its proper valuation in the future years.

The employment of the serum in the treatment of epidemic cerebrospinal meningitis continues to furnish themes for laudatory articles. There remains now no doubt about the greatly reduced mortality rate and reduction of sequelæ by the use of the serum injected into the subdural space of the spinal canal. The importance of a very early employment of the specific treatment is particularly emphasized. The necessity of a highly standardized serum, the use of larger quantities to the dose and frequent injections is recognized. Polyvalence in a high degree is demanded. There have appeared a number of reports of cases of acute meningitis where no organisms could be found in the cerebrospinal fluid, and in a few of them the fluid was clear. Meningismus, or merely a toxic irritation, is to be considered in some cases of this type.

The virus of acute poliomyelitis continues to elude the searchers. Although it has not yet been seen under the microscope, continued successful transmissions are frequently reported. Therefore there is no doubt of the transmissibility of a certain virus from man to man, and from man to the lower animals, and probably as well from lower animals to man. A number of excellent articles and a monograph have resulted from the activities at the Rockefeller Institute of Medical Research and from other laboratories and clinics in this country and abroad. Further work during the past year has indicated with greater certainty the presence of the virus in the nasal and buccal cavities, its transmission through their mucosae and the danger of those regions in spreading the disease. Demonstrations are on record showing that the virus may be present in the mucosae of the stomach and intestines which present no pathological alterations. The sweepings from floors of rooms where acute poliomyelitis cases were harbored have been moistened and passed through Berkefeld filters and the filtrate introduced into the system of monkeys. Some of the animals developed typical cases of acute poliomyelitis and the diagnosis was sustained by autopsies. Flies and other insects apparently may be carriers of the virus, according to several recent accounts. Unconfirmed reports and rumors about poliomyelitis or analogous diseases in animals persist in reaching our attention. All of these indicate the necessity for further instructions and precautions in the individual case and the isolation of all cases of acute poliomyelitis or those suspected. The value of the study of cerebrospinal fluid to confirm or clear up the diagnosis seems apparent. A couple of cases of acute poliomyelitis of the transverse myelitis type have been placed on record during the past year. There may be much difficulty in diagnosing with certainty this type.

The teachings of Fournier and Erb relative to the importance of syphilis as a disease process affecting the nervous system, and especially their view of its responsibility for locomotor ataxia and general paralysis of the insane, are vividly before our mind when we consider the new material of the past year bearing on the subject. Lues assumes a very important if not the foremost place as an etiologic factor in the production of diseases of the nervous system. Recent neuropathological and clinical literature reverses the older dictum that gonorrhoea is more to be dreaded than syphilis. The increasing knowledge respecting the treponema pallidum or spirocheta pallida, the undoubted cause of syphilis, the multiple laboratory tests and Ehrlich's newer arsenical products for specific treatment account for the recent abundance of scientific treatises dealing with lues. The vast importance of the tertiary vascular and gummatous pathological changes in the brain and cord has been elucidated quite clearly and forcefully for a long time past, but it is only very lately that the possibly more important stage, the secondary, as it affects the nervous system, has received deserved attention. It has been shown that many cases treated for dermal lues had unrecognized pathological changes in the central nervous system. Our augmented knowledge of the cerebrospinal fluid and the more frequent resort to lumbar puncture often furnishes aid for the diagnosis. Nonne lays much stress on the lymphocytosis and increased globulin in the spinal fluid in all stages of the neurosyphilides.

Lymphocytosis may be found in individuals free from clinical symptoms, but who had had lues. The positive globulin test, according to Nonne, indicates that the central nervous system is affected. Saenger points out the frequency of positive eye findings in the secondary stages, 22.5% showing some change in the discs. Noguchi has perfected a skin reaction similar to that with tuberculin, and designated as the luetin test. It is not of much value in the early syphilides, but is positive in a high percentage of the later stages and is promising for some of the tertiary neural syphilides and parasyphilitic states. The work of the coming year probably will better establish the more exact value of the test.

There have no doubt been some advances in the treatment of the neural syphilides. The value of the latest arsenical preparations is still in a controversial stage. Salvarsan and neosalvarsan are limited in their value. The best results in lesions of the brain and cord are reported from the use in secondary and early tertiary stages. The necessity for following the treatments with mercury and iodides is noted. There seems to be no special choice between salvarsan and neosalvarsan, excepting possibly for the latter, in that it is less toxic and painful. "Neurorecidives" remain as topics for lengthy discussions. In most of the instances cited it has not been demonstrated that the lesions are not products of syphilitic progression. It must be clearly borne in mind that these so-called arsenical specifics are not complete specifics and that some lesions may continue or later new ones be recognized. The newer studies indicate the frequency of involvement of the central nervous system in lues and the fact that many of the lesions are not perceived until well advanced.

In the etiology of tabes Schultze wishes to give some importance to "trauma" as a factor. If chemical as well as physical traumata be admitted, then it may be important. Everything points to syphilis as being directly the cause, or at least an immense element in the causation of tabes and paresis. But the exact modus operandi is not yet clear. Even Ford Robertson admits that "treponema pallidum infection strongly predisposes" to the development of dementia paralytica, but ascribes the disease to the "Bacillus Paralyticus," which he finds in nearly all cases of tabes and paresis. His experimental data is not confirmed by reliable workers and is probably invalidated by some errors. There does not seem to be a sufficient excuse for his use of the serum. Pilcz states that among a large number of cases of syphilis traced many years later, about 5% developed paresis. One article teaches that patellar reflexes may be retained or restored in tabes (1) when accompanied by hemiplegia, (2) by the development of an amaurosis, (3) and by hygienic, tonic and specific treatment.

Lumbar puncture has been utilized in two methods for the treatment of tabes. Swift and Ellis give neosalvarsan or salvarsan intravenously, one hour later withdraw blood from a vein, separate the serum and inactivate it, dilute to 40% with normal saline and in 48 hours introduce 20 to 30 Cc. into the spinal canal. Some promising results are reported. Browing and Lintz recommend using spinal fluid (autotherapy) by injecting it subcutaneously in cases of paresis, tabes and spastic cord syphilides.

Several additional cases of amyotonia congenita have gone on record. Metabolic observations were conducted in one case, but without any definite positive data resulting. The discussions indicate the difficulty in separating cases from the Werdnig-Hoffmann type of myopathy. In that excellent, exhaustive and complete neurological work, Handbuch der Neurologie, we have for the first time in a book on nervous diseases the malady described under its own title and as a disease entity. Cassirer is the author of that chapter.

It is still the prevailing opinion that epilepsy is a group of disorders with periodic discharges, and those for which no cause can be found are classed as idiopathic. Heredity has not been clearly shown by the application of the Mendelian law. Myer reports having produced epileptic convulsions in guinea pigs by introducing blood taken from epileptics immediately before and after seizures. He believes that there is an excess of some toxic bodies in the blood stream. In this country there is a continued growth and demand for state colonies to care for the epileptic where he is entirely segregated from other nerve or mental cases. Several accounts of the use of calcium lactate with varying success are noted. Spangler reports some unusual successes with the use of crotalin, which is the dried crystaline venom from the rattlesnake. Confirmation of these successes and additional observations are required.

Investigations along the line of the internal glandular secretions has continued actively. Tests with lutein, the corpus luteum of the pig, are of interest. Lutein is used to check some of the nervous manifestations resultant from gynecological disorders. The physiological experimentation with the several secretions from the hypophysis has brought forth a number of inviting articles. Cushing and others, from experimental and clinical data, advocate the use of pituitrin in pituitary states with diminished or absent secretion from the gland. Exophthalmic goitre or a hyperthyroid state is considered a disease primarily of the nervous system, according to conclusions of Crile.

Among the functional disorders the hysterical states have offered the most prolific field for medical writers. The confusion in nomenclature respecting the neurosis and the difficulty in applying the mass of psychological data at hand reminds us of the multiplicities and complexities of the many past classifications for the insanities. The simpler and more readily comprehended classification of Kraepelin is more easily and accurately applied. Freud's theory that all hysterias arise from some subconscious state dependent upon ancient sexual psychic traumas remains a subject for many active discussions. Conservative conclusions indicate that the sexual, as one of the most powerful of the emotions, is the most important cause. A number of other emotions may be provocative of the hysterical states. Janet would class hysteria as a mental disorder. For the treatment of these disorders it is considered important to learn the hidden emotional cause. The analytical and the association method for bringing to the light the buried factors are most frequently used. The education of the individual along the indicated line is one of the newer methods of dealing with the disease. With our increased knowledge of the finer pathological changes in the tissues of the central nervous system and the development of better diagnostic acumen we find fewer diagnoses of neurasthenia.

Among the large group of mental defectives, the feeble-minded have consumed an unusual amount of attention, and their care is a theme provocative of several good articles. The growing idea is that these cases concern medicine, psychology and pedagogy combined. Special schools and teachers are being allowed and further advocated. It is advised that in addition to the visiting physician and nurse a specialist trained par-

ticularly in mental and nervous diseases be employed. It is clearly shown that children with a mild feeble-mindedness and children predisposed to nervousness invite the special attention of the physician, in that if they are properly directed much can be accomplished for them. The nervous child should not go to school too early nor be unduly pushed in his studies. Precaution is sounded about sleeplessness of the child being a danger signal. Warning is issued against the delay in committing the feeble-minded to the special institutions which exist in most states. The Binet-Simon test for more accurately estimating mental development in younger individuals has come into greater use and a number of modifications have appeared.

Heredity and the study of eugenics have been an unusually attractive field in furnishing topics for discussions at medical meetings and articles for journals. The experimental results and statistical studies are having a wholesome educational influence upon enlightened lay organizations. In this connection it may be noted that the prevention of the propagation of unfit strains is being championed with probably increasing results. At the same time studies of environment and extrinsic toxic influences are not neglected. Stockard has for some time conducted a series of experiments with guinea pigs and fish which demonstrate the injuriousness of alcohol during the period of mating and conception. Many neural defects were produced in the offspring from guinea pigs where either male or female or both were given definite quantities of ethyl alcohol by inhalation for a number of days prior to mating.

A ROENTGENOLOGICAL REVIEW OF 1912.

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I propose to review the Roentgenological literature of 1912 as I recollect it. This must preclude reference to many valuable contributions, but will give to the readers what one worker in this field has found of value.

There have been no actually new discoveries so far as I know.

The literature is striking, in that we have less and less general discussion and more and more definite descriptions of work done or of cases examined; and, further, that failure to make the exact diagnosis is being reported. Weil's "Three Cases of Tumor in the Lung with Unusual Roentgen Findings" (*Fortschritte auf dem Gebiete der Roentgenstrahlen,* Vol. XIX, No. 2, Sept., 1912) is an example. In one case the diagnosis is made of tuberculous abscess cavity. Post-mortem examination reveals carcinomatous abscess cavity. Such a case brings us back with a sharp reaction to the fact that the *X*-ray is an instrument of precision for the detection of differences of density. It is only this: when we attempt to differentiate any two pathological conditions we must first show that they have characteristic differences of density. Otherwise this new and valuable instrument of precision has not been intelligently used.

It is a satisfaction to note this year the greater definiteness and more scientific accuracy of the reports, because this shows that both the work and the workers are improving.

Roentgenology divides into three main divisions, each with its apparatus and technique:

Roentgenography, the making and reading of *X*-ray plates.

Roentgenoscopy, the exciting and reading of fluorescent screens.

Roentgenotherapy, the application of the *X*-ray to the relief and cure of disease.

The roentgenograph is mainly used as a record from which to study anatomical and pathological structures.

The accessory sinuses have been extensively studied by means of roentgenographs. At the last meeting of the American Roentgen Ray Association, Dr. George Pfahler enlarged this work by presenting his study of the sphenoidal sinus in health and disease, which was new and which, I believe, will eventually prove of value.

Dr. Hickey gave a new method of exposing the mastoid. His angles of exposure are not intended to replace the older angles, but add a new method by which new facts may be deduced. His method is to place the plate under the occiput and expose each mastoid separately, the tube to be over each mastoid when it is exposed.

A real advance has been made in examination of the thorax. Dr. A. Koehler of Wiesbaden, "Roentgenologic Proof of Calcified Plates in the Aortic Arch of the Living." (*Forts. a. d. Geb. der Roentg.,* Vol. XVIII, No. 3, Feb., 1912). He carefully reports four cases which are illustrated with four drawings and four *X*-ray plates and shows that to obtain such plates we must make very rapid and powerful exposures at the proper angle. Since reading this article I have found several such plates in my collection which I had previously overlooked.

Dr. Groedel, "The Roentgen Anatomy and Topography of the Various Chambers of the Heart" (*Archives of the Roentgen Ray,* August, 1912), has again called attention to the valuable anatomical landmarks of the heart seen upon the roentgenogram. He hopes with the improved apparatus to make this work of great practical value in the near future.

The works of these men have been materially aided by the intensifying screen. I find that made by Dr. T. Edwards of South Bethlehem, Pa., most satisfactory. It reduces exposures to one-fifteenth of the time required for plates without screens, and it is so free from grain that it secures excellent stereoscopic chest plates. This screen is just as valuable in abdominal work, but its paramount importance is not there so apparent.

(a) Also there is a new screen reported from Dresden of which Dr. G. Harting speaks very highly.

(b) The Blitz apparatus for producing a high tension current, I understand, is more powerful than the large transformers made in this country, but I do not know this personally.

(c) Knowledge of how to select a good roentgenographic tube is probably the most valuable technique to the roentgenologist.

Dr. Pfahler (*Fortsch. a. d. Geb. der Roentg.,* May, 1912) published his method, which has proved satisfactory. It consists of exposing an *X*-ray plate through a wire screen and noting the clearness with which the wires show. If the focus of the tube moves during excitation it is practically useless.

The extensive work being published upon thoracic lesions is, as I said, more a study of cases than advanced researches. The studies of stereoscopic *X*-ray chest plates as well as those of the stomach and intestines are proving of the greatest value.

I II III

Beck—Case—Dunham. They reduce the use of the fluoroscope, but can never wholly replace it.

I—E. G. Beck (*Fortsch. a. d. Geb. der Roentg.*, May, 1912, Vol. XVIII, No. 5).

II—J. T. Case (ibid., June, 1912, Vol. XVIII, No. 6).

III—Rockhill and Dunham, K., (Cincinnati *Lancet-Clinic*, Nov. 2, 1912).

No subject is of more interest just now than that of pneumothorax, and no lesion lends itself more readily to *X*-ray observations. No matter whether it be artificially produced as a therapeutic measure in a selected case of pulmonary tuberculosis, whether it be due to tuberculosis and becomes a hydropneumothorax or whether it is a spontaneous pneumothorax, the *X*-ray examination is the most satisfactory means we have of determining its character and extent.

Dr. Forschback from Minkowski's clinic, reports "Healing a Spontaneous Closed Pneumothorax Through Aspiration" (*Fortsch. a. d. Geb. der Roentg.*, Vol. XIX, No. 4, 1912). He shows how by carefully watching his case and when he found that the air was not being properly absorbed by aspirating it carefully, he was thus enabled to draw the heart and mediastinum into place, restore the use of the lung and obtain a cure. His article carries eleven valuable references and five illustrations.

An enormous amount of work has been done upon the stomach, intestines and abdominal viscera.

I shall not speak of the urinary tract, because comparatively speaking that work was finished before 1912.

Talma (*Archives der Mal de Aff Dig.*, 1911, v, p. 594, *Progressive Med.*, Dec., 1912, p. 45) threw a scientific bomb into the *X*-ray world when he claimed that the position of the stomach as outlined by the roentgenogram was untrue, and tried to prove that it had more nearly the position assigned to it by the older text books. His claims of proof lay in what he saw when he inflated the stomach with air.

Groedel (*Archives f. Verdauungskrankeiten*, 1912, xviii, p. 8) accepts that an air-filled stomach has a different position than one filled with a bismuth meal, but believes that a stomach pumped full of gas cannot be so nearly normal as one which contains a pint of good food to which is added only two ounces of bismuth subcarbonate. Further, he proves his position by operating upon dogs. He shows that an air-filled stomach can in no way simulate a normally-filled stomach, and that a bismuth meal does closely simulate a stomach filled with good food. Thus another bubble has been pricked.

Nothing is of more interest than the two-capsule method of examining the stomach contents, and it promises much for the future.

Archives of the Roentgen Ray, Oct., 1912, No. 147, p. 192, publishes the following report from Holzknecht's laboratory:

"Dr. Holzknecht and Dr. K. Fujinami describe a roentgenological method for the detection of "parasecretion" of the stomach. This condition, which is a continuous, as distinguished from an alimentary, hypersecretion of the organ, was originally discovered by Reichmann, who regards it as a secondary disturbance of secretion due to some primary cause, usually ulcer of the stomach.

"This condition has hitherto been recognizable only by syphonage of the fasting stomach, and as its significance was but little understood, it has so far attracted but little attention as a diagnostic symptom.

"A method less disagreeable to the patient would enable us to study the symptom more frequently, and this has now been afforded by the Roentgen method under consideration.

"The first thing is to insure that the stomach is empty. For this purpose we give a bismuth meal, and when all signs of this in the stomach have disappeared we know that it is empty, since the bismuth forms a sediment and is therefore the last portion of the food to pass out of the stomach. The patient then swallows a pair of Kaestle's capsules, i. e., one heavy bismuth capsule which will sink and one which will float on the surface of the liquid in the stomach.

"This method will show amounts of secretion as little as 30 Cc., an amount which may be found in the normal fasting stomach.

"The use of this method for detecting parasecretion has demonstrated the great frequency of the condition. It is never found in normal cases and is never associated with achylia, but is usually found in cases of stagnation with free hydrochloric acid, and in some cases without stagnation, as the only symptom.

"If parasecretion is formed by the Roentgen method in cases where the test meal is considered inadvisable we are justified in assuming that free HCl would have been present had the test been applied. This is often of much practical use. Bismuth remains without parasecretion are apparently peculiar to carcinoma.

"Where there are no chemical tests it is often desirable to know whether the stomach is capable of secretion or whether a state of achylia exists. The method will probably be found of use in other cases. We may use Kaestle capsules in the study of the so-called "psychic appetite," studied by Schmitt, Pawlow and Bidder. The desire for food, the ordinary craving of the appetite, is sufficient to stimulate the secretion of the stomach juices, even although the food may not actually touch the walls of the stomach. We may give a patient a phantom feast, just as Pawlow did in his investigations on dogs. The patient is given a bismuth meal the night before and then swallows the Kaestle capsules on a fasting stomach. If these demonstrate the presence of parasecretion it is evident that the power of secretion is unimpaired. Should there be no parasecretion the two capsules will be seen to lie side by side in the empty stomach. The patient is now given any food he may fancy; bread or cake will generally suffice, but more delicate viands should be at hand should he be dainty. He is allowed to bite and chew the food, but must spit it out without swallowing any. The behavior of the capsules is meanwhile watched on the fluorescent screen. In normal secretion this is most marked, the floating capsule gradually rising up as the volume of the secretion increases, while the heavy capsule remains stationary. Negative results, i. e., when no motion of the capsule occurs, are more frequent than positive ones; but these are of no diagnostic value, since the psychic apparatus in man is so complicated that he is not so easily deceived by the phantom meal as a dog. Absence of movement in the capsule is therefore no sure proof of achylia, but any movement of the floating capsule is a certain sign of the absence of the symptom."

Asmann, in an article entitled "Roentgenologic Proof of Stone in the Pancreas" (*Fortsch. a. d. Geb. der Roentg.*, April, 1912, Vol. XVIII, No. 4), and Pfarringer, (*ibid*, Aug., 1912, Vol. XIX, No. 1), in an article, "A Case of Stone in the Pancreas," show a new field for *X*-ray research.

The subject of antiperistalsis of the colon has been of much interest not only to the *X*-ray workers, but also to the physiologist. At the American Medical Association in June Cannon showed that this occurred. Rieder, "Physiological Movements of the Colon"

(*Fortsch. a. d. Geb. der Roentg.*, Vol. XVIII, No. 2), claimed that he had proof of it, and finds four distinct types of peristaltic waves:

I—Regular peristaltic waves.

II—Great peristaltic waves, progressive.

III—Anti-peristaltsis peristaltic waves.

IV—Worm-like or twisting movements.

Albrecht (*Munich Med. Woch.*, 1912, No. 29) presents an article entitled "The Question of Anti-peristalsis of the Colon in Grave Obstipation." He quotes Reidel and de Quervain as also reporting operative cases which prove the point. De Quervain has also observed the backward movement of the fecal matter, and closes his article with this sentence: "Consequently antiperistalsis seems to be an important factor in the coming on of grievous obstipation." Personally I believe that anti-peristalsis is physiological and may become pathological.

Dr. George Pfahler, in reviewing the Roentgenology of the year (*Journal Advanced Therapeutics*, Dec., 1912; *American Roentgen Ray*, July, 1912), lays particular stress upon the work of Handek, who considers that gastric carcinoma is operable so long as the stomach retains its hook form, and that the short, small, diagonally placed stomach is inoperable. Further, that mobility of the tumor favors operation. The drawing of the pylorus upward and to the left is suggestive of ulcer. In perforating gastric ulcer Handek has noted at times a diverticulum outside of the stomach shadow and communicating with the stomach by a narrow canal, which retains at its upper part a collection of gas.

Dr. Pfahler also (*Proc. Med. Sec. A. M. A.*, June, 1912) describes an excessive sigmoid loop as a cause of chronic constipation and intestinal obstruction. This loop may rise to the under surface of the liver and may be the cause of recurrent bilious attacks or sick headache. Dr. Hickey (*X*-ray Diagnosis of Pregnancy) believes that the lateral exposure will be of value in a number of cases. Dr. Louis G. Cole gives a detailed article, "Serial Radiography in the Differential Diagnosis of Carcinoma of the Stomach, Gall Bladder Infection and Gastric or Duodenal Ulcer" (*American Roentgen Ray*, Oct., 1912), illustrated with twenty-four plates.

The fluoroscope is coming into more active and appreciative use every day, and when we have moving parts to study, as the lung margins, heart, diaphragm, aorta, stomach or intestines it is indispensable. The ortho-diagraph is of much use. Nevertheless it should be dispensed with as far as possible as it is necessarily accompanied with more or less danger to the operator. Again I find no screen which will equal the T. E. It is to be noted that the coil and static machines have their greatest value in Roentgenoscopy.

Lomowitzki, "The Question of Vertical Orthography of the Normal Heart" (*Wien. Klin. Woch.*, 1912, No. 39), studied 292 normal persons, 213 men and 79 women, from 16 to 45 years of age by means of the ortho-diagraph and arrived at sixteen conclusions, which I believe would have been somewhat more accurate had he taken radiographs in a similar position at a distance of two meters.

His conclusions are:

1. Orthodiagraphy is the most precise method for determining the size of the heart in the living human being.

2. Vertical orthodiagraphy offers no particular difficulties.

3. The heart dimensions of the normal being vary within rather wide limits. The size of the front cross section varies between 127.5 and 56.6 sq. cm.

4. In the majority of cases the size of the heart depends on the length and weight of the body.

5. Length and weight of the body each tend to increase the size of the heart. It is, however, more practical to consider the size of the body and not the weight.

6. The maximum deviation of the size of the heart from the average for the respective size of the body is 28.7%.

7. The minimum size of the heart with the greatest length of body is never larger than the maximum heart size with the shortest length of body.

8. Hearts which exceed the maximum for the respective length of body must be considered pathologic.

9. The difference in the size of a male and female hearts of the same length and age is not essential, the female heart being only 2.5% smaller.

10. The position of the heart in relation to the mediastinum is such that its right is to its left part as one-half is to one.

11. The position of the heart in the vertical diameter of the thorax, depends chiefly upon the position of the diaphragm; with a high diaphragm the heart lies high, and vice versa. Consequently the positions of the upper and lower heart boundaries vary.

12. The angle formed by the axes of the length of the heart and body is usually 36-46 degrees. Hearts situated more vertically or horizontally are rare.

13. Length of body has no noticeable influence on the position of the heart, but the heart is apt to lie more horizontally in a broad thorax than in a narrow one.

14. The female heart lies a little higher than the male, otherwise there is no difference in their position.

15. The method of determining the size of the heart by the points of recognition in the front chest wall, frequently used in practic , such as mammary lines, edge of sternum, ribs, etc., etc., is not exact. It is more correct to determine the size in actual figures according to the greatest distance of its boundaries from the mediastinum, and from the line which corresponds to the base of the process xiphoid.

16. In normal persons the right periphery is from two and one-half to six cm. to the right of the right sternal edge, and the left is from two and one-half to nine cm. to the left of the left mammary line.

Dr. A. Howard Pirie, of Montreal, has devised a most interesting fluoroscopic stereoscope. This apparatus requires a stereoscopic tube in conjunction with which is operated a synchronous shutter so that the proper vision will always be viewed with the proper eye. This instrument is ingenious, useful and practical.

Roentgenotherapy:

The *X*-ray has been used for the cure of all ills from bald heads to bunions, but this year stands prominent in the treatment of exopthalmic goiter and hemorrhage following fibroma and myoma of the uterus.

Weber (*Munch. Med. Woch.*, April 2, 1912) made a very good summary of the treatment of hemorrhage.

Lenz (*Fortsch. a. d. Geb. der Roentg.*, Vol. XVIII, No. 5, 1912) (Vol. XVII, No. 5) describes an interesting method of producing local anaemia by means of adrenalin applied to the skin by ionization, and claims that he is thus enabled to give twice the usual dosage without harm to the skin. It would appear to me that such experiments should be thoroughly tried out upon animals by each operator, as miscalculation is too dangerous to risk.

A REVIEW OF SOME RECENT LITERATURE CONCERNING DIGITALIS.

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Introduction.—During the past year I have seen two patients who presented symptoms due to the overadministration of digitalis. One of these patients was a male, aged 67 years, who had an irregular heart when he first came under my observation. A simultaneous brachial and jugular pulse tracing showed a prolonged a-c interval, and the discontinuance of the digitalis was followed by a return of the heart to a normal rhythm. The other patient was a male, aged 64 years, who had chronic nephritis with hypertrophy of the heart. He was complaining of nausea and vomiting at the time he was first seen and had an irregular heart action. The withdrawal of the digitalis was followed by cessation of the nauseau and vomiting, but not by return of the heart to its normal rhythm.

Coincidently with this experience I noticed some publications in the periodical medical press concerning digitalis and I thought it might be valuable to review the literature concerning that drug, which had appeared within the past two or three years.

Pharmacology.—The United States Pharmacopœia [2] thus defines digitalis: The dried leaves of digitalis purpurea Linne [1] (Family scrofulariaceæ) collected from plants of the second year's growth at the commencement of flowering.

Active Principles.—Digitalis contains the following principles: digitoxin, a glucosid, insoluble in water, soluble in alcohol and chloroform; digitonin, a saponin-like body; digitalinum verum or digitalin, a glucosid, soluble in alcohol, but insoluble in chloroform or water; digitalein, a glucosid soluble in water, and digitophyllin, a glucosid resembling digitoxin.

The Effect of Enzymes on Glucosids.—The active ingredients of the crude drug, digitalis, are glucosids, with the exception of digitonin, which is a saponin-like body. The glucosids are, in general, rather unstable bodies, which are easily converted into sugar and other substances by the action of certain enzymes. It had been suggested that the enzymes of the gastric juice or of the pancreatic juice or the acid or alkaline media in which these enzymes act produce alterations in digitalis preparations.

Hale [7] has studied the question by submitting various digitalis preparations, such as digitoxin, French digitalin, digitalein, tincture of digitalis and atrophanthin to the action of artificial gastric juice and artificial pancreatic juice. He found that the artificial pancreatic juice caused a reduction of 25 to 35 per cent. in the activity of the glucosids of digitalis in about three hours.

Deterioration of Digitalis Preparations.—On the other hand, Edmunds and Hale [1] quote the work of Houghton, which shows that a standard tincture of digitalis does not deteriorate in a year if kept under proper conditions. Goodall [12] is of the opinion that tincture of digitalis retains its full activity for one year; but that after that period deterioration is likely. A tincture of digitalis should be kept in the dark, away from artificial heating apparatus, preferably in a refrigerator, and the bottle should be tightly stoppered.

Deterioration of the dried leaves is hastened by an excess of moisture, which promotes enzyme action. Careful drying and sorting of the leaves, however, will reduce this action to a minimum. The idea that they deteriorate rapidly, even when kept under proper conditions, is wholly erroneous (Hatcher [13]). Hale [8] has shown, however, that it is not necessary to reduce the moisture content to as low as 1.5 per cent. in order to prevent enzyme action. In drying the leaves he found it possible to use a temperature of 100° without danger of destroying any of the active constituents of the leaves. On the other hand, when the leaves were subjected to a temperature of 140° there was a decided diminution in their potency.

Potency and Activity of Digitalis Preparations.—Pratt [4] found that nine specimens of digitalis leaf obtained from six of the leading apothecaries of Boston and vicinity and from two hospitals were of poor quality by biological tests. Only one strong digitalis leaf was found on sale. Goodall [12] examined twenty-three samples of tincture of digitalis freshly made by chemists of repute. Twelve were the average strength. The activity of digitalis preparation was found by Hale [8] to vary from 100 to 400 per cent. He found the variations depended (1) upon the locality in which the plans were grown; (2) upon the time at which the leaves were gathered; (3) upon whether the plants were wild or cultivated; (4) upon the percentage of moisture in the leaves; and (5) upon the method of making galenicals. While English leaves are considered by many writers to be the best, Hale's experiments [8] have shown that American grown leaves are quite as active as the selected English leaves. The leaves from wild plants of the second year's growth, gathered at the beginning of the flowering season, are the most active. The stems are about 50 per cent. less active than the leaves. Commercial tablets triturate show a variation of 360 per cent. in activity by biological tests and a great variation has also been found in hypodermic tablets of digitalis by Hale [8]. He also found that a glycerine-water menstruum, such as is used to prepare fluid glycerate of digitalis, extracts only about 40 per cent. of the active principles in the leaves.

Methods of Assay of Digitalis Preparations.—The assay of various drugs has always been considered difficult and, I believe, has been objected to by many firms engaged in the manufacture of galenicals. The reason for this is probably the addition to the cost of production. It is, however, coming to be an essential feature of the marketing of preparations of crude drugs upon which dependence must be placed for prompt action in emergencies. Pratt's experience [4], already referred to, gives ample proof of this statement.

Edmunds and Hale [1] have made an exhaustive study of the methods of assay of digitalis preparations, and this study has been supplemented by that of Hale [8]. The methods of assay may be divided into (1) the chemical, and (2) the biological. In the former, a quantitative estimation of digitoxin is made. Edmunds and Hale [1] state that while digitoxin is the most important constituent of digitalis, it does not necessarily follow that the activity of the drug runs parallel to its digitoxin content. Hale [8] states that digitalein and digitalin also contribute to the activity of the drug. The

chemical method of assay, therefore, is not of practical value.

The biological methods of assay depend upon the action of digitalis and digitalis preparations on some one of the lower animals. These methods may be subdivided into (1) *a general toxic method,* in which the drug is given in sufficient doses to cause death without reference to the organ or organs chiefly affected. By this method a specimen of digitalis with a high content of the saponin-like body, digitonin would cause death from the action of that body on the central nervous system and the drug might be deficient in cardiac action. Furthermore, a certain preparation of digitalis might contain a large percentage of decomposition products and the death might be due to these products and not to the action of the digitalis bodies on the heart (Edmunds and Hale [1]). Therefore, this method is not suitable for tests of physiological activity. (2) *The blood pressure method.* In this method the digitalis preparation is injected into a cat or a dog and its influence on the blood pressure is recorded by a suitable tracing. By this method substances acting upon the vessel walls, as well as on the heart, would tend to complicate the results and render them less dependable (Edmunds and Hale[1]). (3) *The method employing the frog's heart.* There are several variations of this method. (a) The frog's heart may be perfused with a fluid containing the digitalis preparation to be studied. It is liable to many uncertainties. (b) The drug is administered to the intact animal, which is subsequently operated upon and the condition of the heart noted. (c) The frog's heart may first be exposed and the drug then injected; the time of the systolic arrest being noted. Edmunds and Hale[1] and Hale [8] advocate the one hour method in frogs. The animals are weighed, secured to a board, and the drug properly diluted so as to make a volume of 0.5 Cc. or 1.0 Cc. is injected into the anterior lymphsac of the animal by means of a glass pipette. An hour later the frog is pithed and the heart is exposed in the usual manner. If the heart is still beating the dose has been too small and must be increased in subsequent trials. The standard adopted by Goodall [12] in his assay of specimens of tincture of digitalis was that three minims of the tincture should kill a frog weighing twenty grams within four hours.

If the frogs are healthy, of a fairly uniform weight, and are kept at a temperature of from 10° to 15° C.; if the experiments are carried on at a uniform temperature of 22° C.; if the amount of fluid injected bears some direct relation to the size of the animal, say 0.015 Cc. per Gm., Hale [8] finds them satisfactory for the purposes of biological assay.

On theoretical grounds there is no reason why assays, using frogs, will not give results which may be depended on by clinicians and which may be used as a basis for dosage. (Hale [8].)

Preparations of Digitalis.—The preparations of digitalis enumerated in the United States Pharmacopoeia [2] are:

Extract (*Extractum digitalis*) prepared by evaporating the fluid extract in a porcelain dish over a water bath at a temperature of 50° C. (122° F.) with constant stirring until it is reduced to a pilular consistence.

Fluid Extract (fluidextractum digitalis) made with a menstruum of diluted alcohol so that 1,000 Cc. of fluid extract represent 1,000 Gm. of crude drug.

Infusion (infusum digitalis) made with boiling water so that 1,000 Cc. of infusion contains the water soluble principles of 15 Gm. of the crude drug.

Tincture (tinctura digitalis) made with a menstruum of diluted alcohol so that 1,000 Cc. of tincture represent 100 Gm. of the crude drug.

German Digitalin is a mixture of glucosids consisting largely of digitonin, but also of some digitalin verum. *French digitalin* is also a mixture of glucosids chiefly digitalin verum. These preparations, according to Taussig[11], offer no special advantages, "at least when given by mouth."

"*Digitalone* is said to be a 'non-alcoholic permanent solution of digitalis' corresponding in strength to the U. S. Pharmacopœia tincture and physiologically standardized."

"*Digitol* is a preparation of tincture strength made from digitalis leaves, from which the fixed and volatile oils have been removed." (Edmunds and Hale [1].)

Hale [8] finds that the official tincture and infusion answer all the requirements of the physician. He is of the opinion that the fluid extract, which is rarely ever used, is superfluous and that it should not be employed for making the tincture or the infusion. "It is not a desirable digitalis preparation." He is further of the opinion that the marketing of special digitalis products, in the present unsatisfactory state of digitalis standardization, is a questionable procedure. Manufacturers should submit special digitalis preparations to the most rigorous tests before placing them on the market. Furthermore, they should be marketed only when the label bears the date of manufacture. Taussig [11], on the other hand, thinks that the powdered leaf, if it is active, is excelled by no digitalis preparation. He says that the infusion possesses no advantage over the powdered leaf.

Digitoxin, the most potent active principle of digitalis, cannot be used therapeutically on account of its excessively irritant action, its tendency to produce disorders of digestion, its marked cumulative action, and its insolubility in water.

Digalen is a digitoxin said to be devoid of these drawbacks. It was first isolated by Cloetta, in 1904. Kiliani, however, claims that it is only a high percentage of digitalein. It is not always devoid of cumulative action; it possesses marked irritating properties, causes digestive disturbances, and varies in value by biological tests. It has an action on the nervous system in addition to its action on the circulation. Its use in acute heart failure is open to serious objection on account of the danger of pain and thrombosis. (Hale[8].)

Digipuratum is a digitalis preparation freed from about 85 per cent. of inert and undesirable material, including digitonin, by treatment of the alcoholic extract with ether. It appears to have the same strength whether purchased in tablet or powdered form, and is of about the same activity as the strongest official digitalis preparation on the market (Hale [8]). Boos, Newburgh and Marks [9] report satisfactory results from the use of digipuratum in 180 cases at the Massachusetts General Hospital, and Boos and Lawrence [10] say that it seems to approach more nearly to the ideal drug than any of its predecessors. Hale [8] says, however, that it seems to offer no special advantage over a physiologically standardized official preparation, and that it is about 1,500 per cent. more expensive. Taussig [11] says that digipuratum is "perhaps the very best preparation of digitalis."

Physiology Action.—The effects of digitalis on the mammalian heart are the result of two influences: (1) the stimulation of the inhibitory center in the medulla, which depresses the rate, the strength of the individual contractions and the tone o fthe muscle, and (2) the

direct stimulation of the heart muscle, which increases the strength of the contractions, the tone of the muscle, and its excitability. Hewlett [17] does not believe that small doses of digitalis lessen cardiac irritability. The muscular effect prevails in the ventricle; the inhibitory effect is predominant in the auricle. In animals, however, in moderate quantities, the rhythm of the heart is slowed by digitalis because the inhibitory effect is predominant. It is easy to demonstrate the inhibitory (central) action of the drug; but is difficult to demonstrate the muscular (local) action. The improved tone of a dilated heart cannot always be demonstrated clinically (Cushny [14]).

Cushny [14] has studied the effect of digitalis on patients with cardiac disease in Mackenzie's wards at the Mount Vernon Hospital. He divided the cases into two groups: (1) Those in which the dominant rhythm of the heart continued to originate at the normal point. (The node of Keith and Flack at the mouth of the superior vena cava), and (2) those in which the rhythmogenic function was usurped by some other part of the heart. In the first group of cases digitalis therapy is followed by relief of dyspnea, dropsy and cyanosis, but the pulse rate is slowed in only 30 per cent. of the cases. In the second group of cases the pulse rate is slowed in 90 per cent. of the cases.

Digitalis produces a rise of arterial pressure by contraction of the arterioles. Bailey [6] is of the opinion that the vasoconstrictor action of the therapeutic dose of digitalis is slight; but that some rise in blood pressure is seen, particularly in cases in which the pressure is low. He believes this rise in pressure is chiefly dependent upon the increase in the force of the cardiac contractions. Cushny [14], on the other hand, says that the blood pressure of patients is rarely raised by digitalis, and that it may fall as improvement sets in.

The value of biological methods of standardization of digitalis preparations in which frogs are used has been questioned in some quarters. Hale [8] quotes Cushny [3] as follows: "The action of the digitalis group upon the frog's heart is strictly analogous to the action on the mammalian heart, with differences in action which give the three stages of action in mammals dependent upon a greater vagus activity in the higher animal species. In the therapeutic use of the drug only the first stage, which consists of a minimal activity of the vagi and a definitely increased activity of the muscle substance itself, is desired. The action on the frog is almost purely a muscle action and it is upon such grounds that biological assay methods on the lower forms of animal life are believed to give results which are capable of direct utilization in therapeutics."

Lewis [3] is of the opinion that the slowing of the pulse produced by digitalis is due to the production of partial heart block (depression of the conductivity of the bundle of His), and he is of the opinion that it is this action which produces the benefit seen upon the administration of digitalis in cases of clinical auricular fibrillation. Cushny [14] is inclined to agree with Lewis in this action of digitalis; but he says that the direct effect of the drug on conductivity has not yet been accurately determined. Taussig [11] also refers to the depression of the conductivity of the bundle of His; but he ascribed the result to the stimulation of the vagus center. Cushny [14] raises the question whether the chief usefulness of digitalis does not consist in its protection of the ventricle from the too exigent demands on it by the auricle. He is of the opinion that in those cases in which the slowing of the pulse rate fails to follow digitalis administration the center in the medulla is incapable of stimulation or the heart cannot be held in check.

Pure digitonin causes hemolysis, while digitoxin causes edema of the heart muscle if given in sufficiently large doses. Hatcher [13] warns us against the idea that such action is to be attributed to the infusion or to the tincture of digitalis as used therapeutically. While the hemolytic action of digitonin is apparent in test-tube experiments, it does not occur when the infusion of digitalis is taken by mouth. Richard Weil informed Hatcher that 5 Ccm. of blood contain enough cholesterin to protect the red blood corpuscles against the hemolytic action of the digitonin to be found in a therapeutic dose of digitalis. Under no therapeutic conditions could enough digitonin enter the circulation to cause the least particle of hemolysis.

Toxic Effect.—The following symptoms may be due to the toxic action of digitalis: (1) Coupled beats, (2) sinus irregularities, (3) partial or complete heart block, (4) muscular irritability, (5) pulsus alternans, (6) auricular fibrillation, (7) simple slowing (Eggleston [15]).

The toxic action of digitalis is frequently seen clinically. Bailey [6] found evidences of such action in 25 per cent. of 90 cases in the second division of Bellevue Hospital. The toxic effects of digitalis may be divided into three stages: (1) the period of vagus stimulation, (2) the period of depression of conductivity with marked vagus action, (3) the period of marked muscular irritability with depression of contractility.

The first patient to whom I referred in the introduction to this paper exhibited the second stage of the toxic action of digitalis. In the third stage of the toxic action of digitalis the first evidence of muscular irritability is the occurrence of extra systoles.

The cases may pass rapidly from a condition of slowing to one of very rapid rhythm with more or less irregularity, or into a condition of delirium cordis in which no diastolic periods intervene between the contractions. The stage of muscular irritability may be the first symptom of toxic action observed; the other stages being short in duration and easily overlooked. These effects of digitalis should always be determined with the aid of simultaeous jugular and radial pulse tracings (Bailey [6]) or by the electrocardiograph. Hewlett [17] refers to the power of large doses of digitalis to produce extrasystoles.

The irregularities following prolonged digitalis administration are classified by Cushny [14] as (1) *sinus irregularity*, alternate phases of slowing and quickening, due to the inhibition of the rhythmogenic area; and (2) *partial block*, the failure of impulses regularly generated to reach the ventricle on account of failure to be transmitted through the bundle of His. Hewlett [17] also has noted the production of partial block by drugs of the digitalis series. Bailey [6] believes the vomiting seen after the administration of digitalis is a central effect and that it is a sign that absorption has occurred.

When toxic doses of digitalis are given the rise of blood pressure is usually considerable. He has never observed true pulsus alternans from the use of toxic doses of digitalis. On the other hand, he has tracings which show that digitalis therapy has been followed by the disappearance of pulse alternans.

Hale [7] believes that certain of the untoward effects of digitalis medication may be due to the decomposition products of the contained glucosids.

Hale [8] has found that the smallest dose of digitonin capable of producing systolic arrest of the frog's heart

in one hour is 0.0085 mg. per gram weight. The smallest dose of German digitalin was 0.07 mg. per gram weight. The smallest dose of French digitalin was 0.013 mg. per gram weight. The smallest dose of digitalein was 0.024 mg. per gram weight.

Cumulative Effect.—Abrahams [5] regards the doctrine of the "cumulative effect" of digitalis as a myth. He thinks reported cases of cumulative effect are examples of personal susceptibility to the drug. Cushny [14] says that the cumulative action has been held over us as a bogey for years. O nthe other hand, Bailey[6] thinks the cumulative effects often occur during the administration of the drug, and that evidences of muscular irritability may persist for considerable periods. Eggleston [15] believes that the cumulative effect does occur, and reports cases in which the action of the drug lasted from two to twelve days after the discontinuance of the drug. Hatcher [16] says that cumulation does occur and that it depends upon the relation between absorption, elimination and persistence of action. In the laboratory cats show persistence of action longer than dogs, rabbits or white mice. Rabbits eliminate certain of the digitalis bodies very rapidly. The majority of physicians would probably agree with Bailey, Eggleston and Hatcher.

Administration.—In the administration of digitalis the practitioner is often perplexed by the various claims put forward by various writers as to the best preparation to use.

Pratt [4] thinks the best mode of administration is to employ the powdered drug or pills freshly prepared from the powdered leaf. He gives the following quotation from Withering, whose classical work on digitalis appeared in 1822. "A medicine whose fullest dose in substance does not exceed three grains cannot be supposed to stand in need of condensation."

Hale[9] advocates the use of the official tincture or the freshly made infusion. He warns against the use of the fluid extract. He advocates an attempt to prevent the deterioration of digitalis preparations by requiring the official preparations to be neutral in reaction and by prescribing an alkali with the digitalis. He recommends the administration of the drug between meals rather than at meals, when the gastric acidity is at its maximum (see paragraph on deterioration). He thinks the irritation that might result from the administration of digitalis on an empty stomach might be avoided by the taking of a large quantity of water at the same time. Meara [18] prefers the freshly made infusion in doses from two to four drams.

Abrahams [5] advises the use of digitalis in every form of dilation of the heart arising from every possible pathologic source, and Taussig [11] advises its use in all forms of myocardial incompetence. Meara [18] says that when the heart needs stimulation no drug is comparable to digitalis. Both Abrahams and Taussig recommend that the tincture be given in large doses, one dram per day, until compensation is re-established, when the dose should be reduced and the drug continued indefinitely.

Cushny [14] advises the administration of from one dram to one dram and one-half, of the tincture per day. The dose of tincture of digitalis recommended by the United States Pharmacopœia [2] is one cubic centimeter or fifteen minims. It must be remembered that the ordinary medicine dropper delivers a drop of tincture of digitalis which is the equivalent of one-half minim, so that in ordering doses of digitalis it is necessary to prescribe twice the number of drops to get a given number of minims. It is better, of course, to prescribe the proper number of minims and to order a minim graduate for measuring the doses.

In cases of complete loss of compensaton Abrahams [5] advocates one dram doses o fthe tincture, to be repeated in twelve hours if there is no satisfactory amelioration of the symptoms. When the result is seen he advises that the dose be reduced one-half; that it be given three times a day for two or three days, and then that a twenty-drop dose be given three times a day with few, if any, interruptions as long as the patient lives.

In cases of aortic insufficiency he begins with a small dose, five drops three times a day, increasing one drop three times a day until the maximum dose of twenty drops three times a day is reached. As soon as the desired effect is produced the initial dose is returned to and kept up indefinitely. Taussig [11] says that the danger of giving digitalis in aortic regurgitation is entirely illusory. The main point is to give it in sufficient doses until the desired effect is produced and then to discontinue it. The usual mistake is to give it in too small a dose.

In cases of mitral stenosis digitalis should not be given until compensation is entirely lost; then it should be given in twenty-drop doses three times a day (Abrahams [5]).

In cases of aortic stenosis with failure of compensation twenty drops should be given three times a day continuously. Patients with myocarditis can stand fifteen drops of the tincture three times a day (Abrahams [5]). In cases of myocarditis Taussig [11] recommends digitalis whenever the heart becomes incompetent, as indicated by tachycardia, dilation, dyspnea, and signs of passive congestion, whether extrasystoles are present or absent.

In cases of auricular fibrillation he advises the reduction of the dose of digitalis when the pulse rate has fallen to about 80. He says, however, that such patients need to be kept constantly on digitalis.

In cases of partial heart block, Taussig [11] says that digitalis will do harm. In complete block, on the other hand, digitalis may act well by slowing the auricular rate and converting a complete block into an incomplete block (Erlanger and Hirschfelder). In cases of infectious disease, except pneumonia, digitalis does not act well. In pneumonia the benefit is due, according to Taussig [11], to the fact that the heart failure of that disease is due more to obstruction to the circulation than to toxemia. In surgical shock and other forms of shock digitalis is relatively impotent.

In the administration of the infusion of digitalis Meara [18] advises the discontinuance of the drug after from nine to twelve doses have been given. He says that such a quantity of infusion of digitalis will be operative if any quantity will be; that a larger amount may induce toxic symptoms, and that the omission of the medication for from two to four days allows for excretion and prevention of cumulative action. He also says that little reliance is to be placed on the glucosids of digitalis for prompt action or for full equivalent of the action of the leaf or its official preparations.

Contraindications.—The contraindications for digitalis are partial heart block, recent embolism, cerebral hemorrhage, aortic aneurysm, uremia, hyperthyroidism and the cardiac neuroses (Abrahams[5], Taussig[11]), and aortic insufficiency with an irregular pulse (Abrahams [5].)

Abuses.—The abuses of digitalis are its routine employment for precordial pain, palpitation, valvular murmurs, "heart disease" (Abrahams [5]), cardiac abnormality, or the discovery of a murmur (Cushny [14]). "A valvular lesion of the heart in itself requires no treatment." Taussig [11]. Other abuses, according to Abra-

hams [5], are the discontinuance of the drug as soon as its therapeutic activity is manifest, an overconfidence in the drug, so that it is used to the exclusion of other remedies, and an insufficient dosage.

Conclusions.—1. The physician who prescribes digitalis digitalis should be sure that an active preparation is dispensed by the pharmacist. 2. The activity of digitalis preparations should be tested biologically before they are dispensed. The one hour method in frogs is practical and dependable. 3. In addition to powdered digitalis the tincture and the infusion offer all the advantages of digitalis medication for administration by mouth. The fluid extract may be disregarded and would better be dropped from the Pharmacopœia. The physician should not accept a tincture, made by diluting the fluid extract, upon a prescription calling for *tinctura digitalis*. 4. For hypodermic use digipuratum appears to be reliable. It is expensive, however. 5. Digitalis in therapeutic doses does not always raise blood pressure and would better not be depended on for that action. 6. The occurence of cardiac irregularity in a patient, whose heart action was regular before the administration of digitalis, is a signal of toxic action and the digitalis should be stopped forthwith. 7. Digitalis does have a cumulative effect. The effect is of course, a toxic manifestation. 8. Cardiac failure is the indication for the use of digitalis. 9. The dose should be sufficient to product the required result. 10. Ten drops of digitalis is the equivalent of five minims. The pharmacopœial dose of tincture of digitalis is fifteen minims, thirty drops.

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The great indication for digitalis is cardiac decomposition without regard to the particular valve lesion that may be associated with it.

REVIEW OF THE TUBERCULOSIS SITUATION IN 1912.

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In reviewing the work done in tuberculosis during the past year we find that very few new ideas have been introduced. Those who are working in this disease have been busy perfecting the work of Koch, Forlanini, von-Pirquet and others, improving their own technique and observing cause and effect, giving liberally, through the medical press, their experiences to the great benefit of that large body of students, the general practitioners. In this way there is a far greater and broader general understanding of the treatment and management of tuberculosis by physicians than ever before. Tuberculin is now being intelligently administered by hundreds, whereas but a few years ago its use was entirely confined to a few sanatoria. The diagnostic use of tuberculin in its several different forms is being widely applied. I recently listened to a paper at one of the county medical meetings of this State upon "The Value of Tuberculin in the Diagnosis of Tuberculosis," and was surprised at the general knowledge displayed by those who engaged in the discussion.

In 1882 Forlanini published a statement to the effect that he was seeking to develop a suitable technique for the establishment of artificial pneumothorax. In 1894 he reported several cases and gave his technique. In 1898 John B. Murphy of Chicago, independently of Forlanini, published his experience and gave his technique, which differed from that of Forlanini, in that he made an incision down to the pleura before introducing the needle, whereas Forlanini made a needle puncture only. Although both of these men reported brilliant results, the profession has been exceedingly slow in taking up this rational procedure, being satisfied with the rest of the lung derived by a recumbent position. Not until the past year has this method been used in this country to a very large extent. Several very excellent papers have been published in the American medical press, the papers of Robinson and Floyd in the *Archives of Internal Medicine* and of Balboni in the *Boston Medical and Surgical Journal* being especially worthy of note. Balboni presented a very comprehensive review of the history of artificial pneumothorax, with minute details of the technique, at the same time reporting quite a number of cases with favorable results. Floyd and Robinson reviewed the subject and reported several cases. Louis Hammond of Baltimore and Mary Lapham of North Carolina have contributed to the literature in this country. I find that more than 250 papers were published on this subject in 1912, most of them appearing in foreign journals. Floyd has devised a needle which simplifies the introduction of nitrogen gas into the chest, as well as an outfit that can be carried to the bedside, to the great convenience of the patient.

Karl von Ruck of Asheville, in the *New York Medical Journal*, makes a preliminary report of his method of immunization of children. This idea was first introduced by Webb of Colorado Springs two years ago.

Friedman of Berlin, who has recently come upon the stage through the back door—"the public press"—has, for that reason, created much distrust. His theory is probably the injection of attenuated tubercle bacilli which are said to have lost all the toxic properties and

only retain and exert a curative influence. The theory is beautiful and we hope it will prove all that is claimed for it. Time has changed so many "sure cures" into worthless and sometimes dangerous procedures that the conservatives say, "Let us wait and see what we will see." I am of the opinion that the injection of attenuated tubercle bacilli cannot be proven entirely without danger for many years. We all know that the implantation of tuberculosis takes place in childhood and yet does not become active until many years later. Can we say positively that the attenuated tubercle bacilli injected deep into the muscles will not become active in later life? It is the custom of bacteria to become attenuated and then under favorable conditions become exceedingly active.

There is a tremendous effort being made in many laboratories in the world to work out a method of immunity and a cure. It is evident from the experiments that have been reported that we are nearing the goal, and it is reasonable to expect that the greatest problem of the age will be solved in the near future.

While the scientific work has been going on with more or less success, the heretofore neglected work of prevention has been forging ahead. Hospitals are being built in municipalities, counties and districts all over the United States. The decrease of tuberculosis in any community is in direct proportion to the number of beds available for the purpose of isolating advanced cases. If all cases of tuberculosis could be confined in a hospital the last four or five months of their lives it would be but a few years until tuberculosis would be under control.

The natural clearing houses for these hospitals—the Anti-Tuberculosis Leagues—have also increased in number and efficiency. It is here that the great social service work is done. It is the league that is carrying on the educational work, teaching the public the danger of infection and how to avoid it, and, most of all, creating public sentiment, which in turn furnishes the money to carry on this work and the votes that furnish the bonds to build the hospitals.

In Cincinnati the campaign of the Anti-Tuberculosis League with its moving picture show, "Darkest Cincinnati," showing the districts where tuberculosis is most prevalent, resulted in the issuing of bonds to the extent of $360,000 to further enlarge our tuberculosis hospital. It also effected the condemnation of many tenement houses, gave a great mass meeting of 5,000 citizens with speakers of national reputation in the better housing movement and brought about the formation of a "Better Housing Commission." This Commission has the power to order abandoned or repaired any tenement house that may be considered by it a menace to the public health through the unfortunate individuals who live therein.

This is great preventive work. Without such a movement in any large city it will be impossible to stamp out tuberculosis. We cannot hope to segregate or isolate tuberculous patients as rapidly as they are infected in these districts. Therefore it becomes imperative that the tenement districts be cleaned up under the personal supervision of the Board of Health and that all tenement houses that cannot be put in hygienic condition be removed.

In the past we have been helpless in our control of patients in municipal hospitals. They could come and go at will, and all the effort and expense of several months' treatment was lost because there was no law to retain patients until the disease is arrested. Patients in the advanced stage, a menace to the general public, left the institution, returning after a debauch, in many cases, to repeat this cycle at their own pleasure. In 1912 New Jersey passed a law, a copy of which should be obtained by those who are interested in the proper control of tuberculous patients. This law provides for the purchase of ground and the construction of a hospital by the County Commissioners and also provides for the organization of the same; instructs the State Board of Health to make rules which shall govern the action of all tuberculous patients, a copy of these rules to be furnished the local Boards of Health and to all physicians residing in the State.

Article number eleven of this law reads: "If any person fails to obey any of the said rules or regulations of the State Board of Health the offender may be committed to any county hospital by any judge of the Court of Common Pleas." Article twelve reads: "Any person so committed to said county hospital or who neglects to or refuses to obey the rules and regulations of that institution may be, when in the judgment of the superintendent it is necessary, isolated or separated from other persons and restrained from leaving the institution." Ohio has before the General Assembly a bill very similar to the New Jersey law. In Massachusetts the health officer has police authority to arrest any person having a contagious disease who, in his opinion, is a menace to the health of the general public.

With the laws already in effect in the few States showing the way for others to follow, and the mind of the general public gradually being educated to the fact that tuberculosis is even more dangerous than smallpox, gives us hope that with the progress of scientific treatment and the absolute control of the menacing tuberculous patient the near future will show a very marked decrease in the number of cases and that within a few years tuberculosis will be entirely under control.

Fatal Haemorrhage in the Newborn.

During delivery a child received a small abrasion from the forceps. The hemorrhage from the wound was stopped by compression, but broke out again the following day, and continued until death early the next morning. Some hemorrhage from the umbilicus occurred shortly before death. At the necropsy a large haematoma was found in the scalp, and a subpleural haematoma at the base of the right lung. It was an open question whether the condition was due to haemophilia or to some infection, the mother having a raised temperature during the first three days of the puerperium. There was no evidence of syphilis.—(*Bull. d'Obst. de Paris,* 1911, xiv.)

Melaena Neonatorum.

P. Vidal distinguishes a melæna spuria due to swallowed blood, usually from cracked nipples, and melæna vera due to hemorrhage within the alimentary canal. The cause of melæna vera may be syphilis, hæmophilia or infection by any of the following microbes: Streptococcus, B. coli, B. pyocyaneus, Gaertner's bacillus, pneumococcus, B. lactis aerogenes. Melæna vera is usually preceded by hæmatemesis, and is often associated with other hemorrhages, especially from the umbilicus. The prognosis in melæna spuria is uniformly good, but is very grave in melæna vera. Injections of gelatin or normal saline are recommended for treatment.—(*Theses de Paris,* 1911-12, No. 69.)

Gastro intestinal acid fermentation, excess ingestion of acids, and acid forming foods, are among the causes that one investigator claims contribute to diabetes mellitus.

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NEW YORK, FEBRUARY, 1913.

Owing to the splendid array of review matter presented in this issue, it has been necessary to omit several departments.

PARTICULAR TRAINING IN MEDICAL SPECIALTIES.

The action taken at the recent Clinical Congress of Surgeons of North America looking toward the establishment of a post graduate surgical degree is being received with acclaim by the medical press. While America is undoubtedly the surgical leader of the world, we have a class of men who aspire to be surgeons, but whose experience is insufficient to warrant them in handling the more delicate operative work which every surgeon is called upon to perform.

If this body of earnest men were given the training which the preparation for a Fellowship in the American College of Surgeons would demand, we would eventually possesess a great number of surgeons quite capable of meeting every surgical emergency. The proper educational requirements would give the title F. A. C. S., real and tangible value.

This brings up another point.

If surgeons are to be specially trained before taking up the serious work of life, why not train every specialist in every special branch? The opthalmologist, laryngologist, gastro-enterologist, the gynecologist and followers of every other special branch of medicine should be compelled to do a year or two of postgraduate work in his own line before being permitted to establish himself.

The State of New York now insists that the chiropodists practicing within its borders shall have unusual qualifications before being licensed to practice and the School of Chiropody of New York grants the degree of Master of Chiropody to its graduates. As a result, the degree of M. C. will in the future insure the patient the services of a scientific pedist. In the not distant future the M. C. will also be an M. D. If we are to have our pedists highly trained in their work, why not our orthopedists, dermatologists and all the others?

Dr. Wendell Reber of Philadelphia struck a popular chord in a paper he read at the recent meeting of the Pennsylvania State Medical Association and quoted in the *Therapeutic Gazette*. In discussing "The Teaching of Ophthalmology in America" he advocated postgraduate instruction and the conferring of a "Degree in Ophthalmology" on men who had successfully carried out the required course of instruction.

Dr. Reber holds that thoroughgoing ophthalmic in- an understanding so that students would spend their time of study in different institutions and have each course count toward the certificate. He says there are now in this country fourteen well-recognized postgraduate institutions. There should be brought about some agreement among them as to the minimum training required of applicants for examination, and some approach to uniformity in the ordering of a three and a six months' course.

Dr. Reber holds that thoroughgoing ophthalmic instruction is to-day best obtained in a postgraduate institution with its attached clinic or clinics, the one exception being in the case of those few men who may attach themselves for a period of years to a well-organized ophthalmic clinic in their own cities.

He recommends that no applicant for postgraduate teaching should be admitted to any of the well-recognized specialty courses who has not completed three years in general practice or its equivalent in general hospital work.

If this idea could be carried out in connection with all the specialties in medicine we would have in a few years a highly trained body of men, to whom the public would turn as the men best qualified by education and experience to carry on their work.

THE NECESSITY OF ELIMINATING IRREGULARS.

In a recent editorial reference was made to the "Fake methods as employed by 'somewhat' irregular practitioners and out and out quacks."

A well-known electro therapeutist has taken exception to some of the statements, believing that they constituted a serious indictment against the men practising his specialty.

Careful reading will clearly demonstrate that "irregular practitioners and out and out quacks" were the class against whom our editorial utterance was intended. Legitimate electro-therapeutists have nothing to fear from such publicity.

We called attention to the pseudo-specialist, who claims he can cure every ill the flesh is heir to by the aid of the static machine.

Electro-therapists do not claim they can remedy every ailment with electricity and the quacks do.

If our critic will consider this phase he will see the value of ridding his branch of medicine of those men, who, for gain, bring its methods into disrepute.

RACIAL DECADENCE.

If we are to believe Dr. Theodore B. Hyslop, the English psychologist, half the world's population is fated to be insane in fifty years. "It has been calculated," he says, "that within fifty years the ratio of the fit to the unfit will be as one to one." This is an indictment indeed. Altogether too sweeping to be credible, in our judgment. Hyslop is certainly the arch pessi-

mist of his day. There is one pronouncement of his, however, with which we heartily agree. "It is useless," he declares, "to take men from the gutters if the gutters are left intact." Society is largely committed to the policy of amelioration, rather than radical cure, although of late this policy has received some rather hard knocks and there are indications that a sane handling of the problem of racial decadence is not altogether out of reckoning. Perhaps alarmists like Hyslop ought not to be discouraged. While they overstate matters they serve to concentrate the public mind upon really serious concerns and prompt a healthful grappling with remediable conditions. We are too familiar with the history of fanatical reformers to feel anything for them but a tempered respect, provided their programmes are based upon reasonable sound premises.

Forbes Winslow, in his day, predicted a time which he said could be easily calculated when the insane would outnumber the sane. Thus we have had two generations of pessimists. Are we going to make a third impossible?

HEALTH BOOKKEEPING.

The campaign for the better registration of vital statistics on the part of the Association of Life Insurance Presidents is a commendable move. The association will co-operate with the United States Census Bureau. By publishing accurate information in respect to the character and extent of diseases and mortality it is expected that indifferent communities will be awakened to their sanitary duties. A standard form of registration is also advocated. The great cause of preventive medicine should certainly be furthered by this propaganda. The association's health committee points out that advantageous use of recent achievements in the field of preventive medicine cannot be made without reliable vital statistics. For some strange psychological reason communities are often less fearful of long standing diseases carrying a high mortality, though largely preventable, than they are of an occasional visitant like smallpox. By publishing the fact of unhealthfulness, as regards a given community, its citizens will be more strongly influenced to abate preventable disease than they would be by mere mandatory legislation.

THE ECONOMIC AWAKENING.

There are signs on every side that the medical profession is becoming alive to the necessity of dealing aggressively with the many abuses which operate to cripple its members financially and to injure them in public esteem. We have never departed from the old ideals in respect to our duty towards the sick, and there is nothing in the proposed reforms and their method of induction to inspire doubt as to their maintenance. The newly organized American Society of Medical Economics is made up of the very flower of the profession and the plans which are in process of formulation by this society are wholly admirable. That their application will result in a decided amelioration of the abuses under which we suffer, and which are so notorious that there is no necessity of recapitulating them here, we have not the slightest doubt. The new society can count upon our unreserved co-operation.

The keenness in respect to economic problems which is coming to characterize us is not indicative in any way, if rightly viewed, of a depreciation in professional tone. We are morally bound to consider and to act upon the facts and conditions that encompass us, not so much because it concerns our economic salvation as because of their bearings upon the further progress of the science and art of medicine. That is the thought, after all, that is uppermost in our minds. A wholesome economic environment means a wholesome grappling with the problems of the sick. That is the ultimate goal always.

It goes without saying that a medical society organized for scientific purposes is not the proper place to discuss economic matters, in so far as they are related to the private concerns of physicians. The move to organize a society which shall be devoted to such matters divorces them from our scientific concerns and is a wholly wise and promising step.

FRIEDMANN'S ALLEGED TUBERCULOSIS CURE.

Friedmann's cultivation of a race of tubercle bacilli endowed with immunizing qualities and relatively devoid of noxious effects as regards antigen, and derived from the turtle, is the latest and most startling phase of the world-wide effort to devise a cure for our worst scourge. This "benevolent" strain of tubercle bacilli is said to cause no reaction when administered, and the curative results so far obtained are declared to be striking. A thorough investigation of the inventor's claims is now under way in Germany, carried on by Friedmann's colleagues. The scheme is excitative of the keenest interest. We must divest ourselves of skepticism, at least of the unjudicial sort, and study with an open mind this new development in the field of therapeutics, indeed we should pray for its success.

As regards Friedmann's chariness about details different attitudes will, of course, be taken. Many will applaud his departure from the lofty altruism which has usually marked medical discoveries, believing that there is a righteous and wholly defensible self-interest to be conserved, bound up with which is a certain safeguarding of the public as regards commercial exploitation with its possible evil results. A sinister connotation need not necessarily be entertained.

LEGAL MEDICINE AND ITS EXPONENT.

Almuth C. Vandiver, B. Sc., LL. B., counsel for the Medical Society of the County of New York, has accepted a position upon the board of contributing editors of THE MEDICAL TIMES. This will permit the addition to our pages of a department of legal medicine contributed by one of the best known lawyers in New York. Through his unusual ability in protecting the interests of the medical profession of New York Mr. Vandiver has gained an enviable position in the estimation of physicians, who recognize his unusual attainments.

Mr. Vandiver is a native of Alabama, a graduate of the Alabama Polytechnic Institute and the law school of New York University. He earned his legal spurs as a deputy assistant district attorney under William T. Jerome for several years. He resigned February 1, 1908, to enter partnership with Judge Charles S. Whitman of the Court of General Sessions. This partnership was dissolved January 1, 1910, upon the election of Judge Whitman as district attorney of New York. Since that time Mr. Vandiver has practiced alone, specializing in medical and corporation law.

The legal profession regards him as one of the leading members of the New York bar and one whose acumen and natural gifts have placed him at the forefront of his profession.

The readers of THE MEDICAL TIMES can congratulate themselves that the department of legal medicine will be in such authoritative hands.

Medical Editorial Table

THE AUTOMOBILE KNEE.

Extremely indolent persons who rarely walk and who spend many hours motoring sometimes present peculiar conditions as regard the knee. The limbs of these people are apt to be fat and the circulation poor. The limited use of the limbs also causes a lack of firmness in the periarticular ligaments. The joints lack resistance and become susceptible to injury from slight strains. The danger is increased by footwear that does not properly support the body weight. Knee strains are not uncommon in such individuals and are often mistaken for rheumatism or gout. It is true that these may complicate the condition. The pure type may be classed as chronic congestive strain of ligaments of the knee joint. No increase of synovial fluid may be noted, but complaint is made of great fatigue or pain in standing. There is little or no pain unless the limb is used in weight-bearing exertion. The pain is localized on the inner side of the knee, passing from the inner condyle to the tibia and slightly in front. There is tenderness on deep pressure and sometimes quite marked sensitiveness, but no heat. Kneeling and bending the knees and walking up-stairs cause pain. Bending the knee while the patient is standing causes most pain. Careful passive motion is not painful. The affection is more common in women than men, much more so, in fact. This condition may also be observed in persons of muscular inactivity who walk but little and are able to digest well, with active appetites.—(*Boston Medical and Surgical Journal,* Dec. 5, 1912.)

Recent Advances in the Interpretation and Treatment of Pruritus Ani.

It is possible to overlook the importance of the minor ailments of humanity which, although not life- threatening, are responsible for a great amount of suffering and disability. Pruritus ani is a case in point. There is a large group of these cases which are said to be purely functional or neurotic, and for which no gross origin can be adduced, such as hemorrhoids, fissures, fistulæ, eczema, intestinal parasites, and metabolic derangements such as gout, diabetes, etc. But the boundaries of this functional group are being more and more restricted because of important recent contributions. Thus James P. Tuttle of New York has described a new morbid entity of which pruritus ani is the main symptom and called by him "cryptitis." There is an exaggeration and inflammation of the crypts that dip down from the sinuses of Morgagni beneath the mucocutaneous margin of the anal outlet. These crypts are irritated by the presence of retained fecal matter, and present all the phenomena of blind internal fistulæ. They are difficult to detect. A shepard's-crook probe is used to determine their presence. The hypertrophied anal folds and taps to be observed are not the result of scratching or excessive moisture, but are the external manifestations of the inflammation of these crypts. Effective treatment requires dilatation under general anesthesia, careful search, and complete obliteration as in the case of blind internal fistulæ. Another worker, the late Sir Frederick Wallis, found that in ninety per cent. of his inveterate cases of pruritus ani there was a small ulcer abrasion, or submucous tract which was found usually between the two sphincters, more often in the posterior half than the anterior, and generally near the dorsal midline. These lesions rarely heal of their own accord and become chronic ulcers covered by granulation tissue which exudes an irritating secretion causing pruritus ani. The difficulty is that the ano-proctodeal area is not skin and not mucous membrane, and has not the tough resisting power of the one nor the vascular supply of the other. Another factor in the production of pruritus ani has been studied by Murray, of Syracuse—streptococcic skin infection. He regards this as the predominating element. Autogenous vaccines made from the streptococcus fecalis cause a relief in the itching and a concomitant disappearance of the strepticocci from about the anus.—(*Medical Record,* December 7, 1912.)

Care of Mentally Defective Children.

There are said to be 2,200 mentally defective children in the special classes of the public schools of New York City and three per cent. of the children born in the United States are alleged to fall into the same class. The fact is now widely recognized that such mental defectives are the result of the parentage of the unfit, and to prevent the perpetuation of the unfit and to protect society from the forces that have conspired with so much success during the nineteenth century to debase and prostitute a large part of the population of civilized nations it will be necessary, not to repeat Sparta's legislation of attempted extermination of the living, but to prevent the reproduction of generations of types unsuited to our ideals of the twentieth century man and woman. The outlook is promising; the first steps are being taken. Several States, following the lead of Indiana, are subjecting their criminals to sterilization. In the light of nineteenth century theology it is indeed both curious and gratifying to note how quietly and completely the viewpoint of modern intelligent communities has shifted as to this matter of the fecundity of feminine humanity. Fifty years ago unlimited offsprings of all classes of the community was expected, quantity satisfying the demands of church and State, quality never being inquired into. In these latter days, except in Eastern Europe, food for powder not being in great demand, the requirements of a civilized existence are attracting more attention and the human factors that make for intelligence, morality and social life demand a cutting off from society of all those whom natural selection has failed to eliminate.—(*The Lancet-Clinic,* November 23, 1912.)

Factors Contributing to Recent Advances in Our Knowledge of Communicable Diseases.

Our knowledge of the etiology of infectious diseases has advanced greatly, but unfortunately the application of this knowledge to the control and eradication of them has not kept pace with its acquisition. With a few notable exceptions, such as the control of yellow fever through mosquito eradication and of bubonic plague by rat campaigns, health authorities have been slow to apply the great mass of information now available to them by reason of the researches of the last few years. What at present is more needed than research is a more general application of the results already at hand. Research in our large institutions should of course be encouraged and developed; but the laity, physicians and health officers should be especially impressed with the importance of using the information already available. Our law-makers should also be informed that it requires money to carry out the measures for the control of disease which have been pointed out so convincingly by laboratory studies. Who can predict how many lives would be saved and how many

cripples for life prevented if means were provided for fly campaigns next summer in order to carry into effect measures for the prevention of poliomyelitis by the control of the stable-fly?—(*J. A. M. A.*, December 14, 1912.)

Local and Remote Complications Following Bullet Injuries to the Nerves.

The general symptomatology of bullet injuries to the nerve trunks is well known, but the same cannot be said of the local symptoms. When exaggerated they may give rise to distinct pathological phenomena. Deformities may result, because of deviations following paralysis. Tonic contractions or spasm of the paralyzed muscles have been encountered. Causalgia is not so frequently met with to-day as formerly. In the later wars it has not been observed much. It is characterized by the sensation of deep seated, dull pain, or by very sharp burning pain, retaining a high degree of acuity. Sensorial tetanus may occur when the hyperesthesia is prolonged, the centres becoming exalted and propagating the erethism in all directions. Energy and strength are rapidly lost and suicidal ideas may arise. A long lasting hysterical neurosis may develop, perhaps requiring resection of the injured nerve. Peripheral traumatic epilepsy is sometimes observed, especially in connection with injuries to the sciatic nerve. It differs from ordinary epilepsy in that it manifests itself by spasm of the wounded limb, this at length becoming generalized. Chorea is less common than epilepsy, while traumatic hysteria does not appear to have attracted any attention. Distant paralyses may arise late, and are both persistent and incurable. They may be combined with muscular atrophy, originating doubtless from profound changes in the cord, such as ascending myelitis, either diffuse or circumscribed at some point. The hemiplegic type of these paralyses by propagation is the most uncommon, and for pathogenic reasons paraplegia is frequent.—*New York Medical Journal*, December 14, 1912.)

Creed for an Every-day Church.

Dr. F. S. Thomas of Maquan Sanitorium, South Hanson, Mass., sends out the following excellent precepts as the principles of the every day church:

I. Religion does not consist in the adoption of a creed, nor in the observance of stated rites, but in reverence for the good and true, in aspiring to noble character and in devotion to the upbuilding of the human race.

II. Truth is greater than tradition. We should accept the truth revealed through modern knowledge.

III. The Book of Life contains many helpful lessons in Bible, Nature and Experience.

IV. Our children should be given a non-sectarian and simple religious education.

V. We would encourage private rather than public prayer in our religious life.

VI. We will discourage the manufacture and sale of intoxicating liquors for beverage purposes.

VII. We should not condemn the unfortunate, but help them up the heights of noble life.

VIII. We will discourage the war spirit and will encourage the spirit of brotherhood among men and nations.

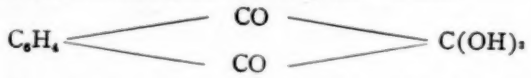
IX. A true church should protest against the greed and power of wealth, and should seek to better the life conditions of the whole people.

X. More than all, we would be true friends to one another in prosperity and in adversity.

PROGRESS IN THERAPEUTICS.

New uses for old drugs and new drugs for old diseases were discovered during 1912.

Triketohydrindenehydrate.—One of the chemical compounds which bids fair to excite much interest is triketohydrindenehydrate, having the formula



This is the produce made use of by Abderhalden in his biological diagnosis of pregnancy.

We quote the introduction from an article on "The Biological Diagnosis of Pregnancy" by Franz and Hermann, appearing in the *Berlin. Klin. Wochenschrift*, Sept. 2, 1912:

"Through the comprehensive labors of Abderhalden and his collaborators during the past few years the biological significance of the conception of *blood-foreign substance* has been demonstrated. The organism not only (as we have long known) regulates the quantitative composition of the blood and tissue fluids, but it is also extremely sensitive to qualitative alterations. Should an albumin enter therein, the constitution of which deviates ever so little from that of the serum proteins, or a carbohydrate, fat or lipoid which does not regularly occur therein, the organism mobilizes certain ferments which appear in the blood stream and at once disintegrates the foreign substances into simpler substances. Abderhalden has the idea that many of these substances, which do not occur normally in the blood, may be harmful to many if not all of the cells, that the newly appearing ferments, are, therefore, to be conceived as protective ferments, which denature these substances before they can injure the cells.

"As a rule these protective ferments do not occur in the blood-plasma. The cells of the intestinal wall and liver are evidently in position to transform the nutriment into material proper to the blood. This conclusion coincides well with the results of investigations into the physiology of digestion, which show that the nutriment undergoes extensive cleavage in the gastroenteric canal. However, if one drenches the intestine with a given nutrient substance—for example, egg albumin—and the barrier supplied by the intestinal wall and liver gives way, ferments may then be generated by the enteral route which could be obtained otherwise only by subcutaneous or intravenous exhibition.

"It has already been indicated, but has not perhaps been emphasized, that every category of nutrient material may incite toward itself a ferment activity. If one injects an animal with a solution of albumin the plasma acquires the ability to disintegrate proteins, peptones and even peptides; and after parenteral exhibition of cane sugar an intervase appears in the blood. Through overfeeding with fat one succeeds in notably increasing the power of the plasma to split up fat.

"In contrast to the reaction products of the doctrine of immunity—the amboceptors, precipitins, etc.—the substances now under consideration are non-specific. For example, if one injects horse serum, the plasma of the experiment animal, after a certain time, not only exerts proteolytic activity in the horse serum, but also splits egg albumin and milk peptone. When cane sugar solution is injected the plasma becomes able to decompose milk sugar.

"It was to be supposed that the albumin of every individual organ possesses a structure which differs from that of any other and also from that of blood

albumin. Hence the specific albumin of an organ is to be regarded as foreign to the blood, and as a generator of blood ferments. It, in fact, may be shown that when an animal's own organ juices are injected into its blood there is a response in the appearance of ferments in the latter."

Kaolin. A new idea is the use of sterilized Kaolin for use as a powdery dressing for wounds of various kinds and internally in such diseases as diphtheria and enteric processes without obstruction. It is given in suspension of a teaspoonful at a dose and can be very largely increased if it does not cause vomiting. Adults are given as high as six to ten ounces and infants up to one ounce without difficulty. Kaolin is used largely in Germany. Schönenberger had remarkable results in the treatment of both recent, bleeding and suppurating wounds, to phlegmon, chronic eczema, ozæna, fœtor oris, suppurating bone tuberculosis, syphilitic affections, aphthous conditions, diphtheria and hyperacidity. Graeser is also favorably disposed towards the kaolin method in consequence of his excellent results in intestinal affections, as he has seen surprising results from the employment of kaolin in the diarrhea of typhoid fever diarrhea and vomiting, and ptomaine poisoning. In the diarrhea of typhoid fever it led to normal movements within a short time. If vomiting is present he advises the use of dilute suspensions which have been cooled by ice, and in desperate cases the use of morphine injections to check the vomiting. He is also of opinion that for diarrhea and vomiting corresponding doses of kaolin suspension applied rectally might prove of service.

Staby treated amebic and bacillary dysentery with calomel and castor oil for the first three days, and then with kaolin. He gave 3⅓ ounces of kaolin in 10 ounces of water in the morning on an empty stomach. The kaolin medication proved especially favorable in bacillary dysentery, in which the motions frequently became formed with surprising rapidity and the blood disappeared from the stools. In his experience, kaolin treatment appears to have a favorable influence on the catarrh of the large intestine which accompanies dysentery.

According to Krauss, kaolin acts as a sedative on the intestines and envelopes the harmful bacteria to such an extent that they can do no further harm.

Gewin reports upon the dry treatment of leucorrhea. He obtained very satisfactory results by the insufflation of kaolin powder into the vagina.

W. Liermann combined kaolin with azodermin, alcohol and glycerin for the treatment of small wounds and wound surfaces, of fistulæ after appendicectomies, erosions of the cervix, remnants of the umbilical cord, eczema, herpes, intertrigo, furuncles, ulcers and hyperidrosis. This compound is used in the form of a paste, which is issued ready for use and was named by the author "kaolin wound paste." American physicians are familiar with the remedial value of kaolin and glycerin poultices as exemplified by antiphlogistine, but the internal use of kaolin is new.

Progressive Medicine for December, 1912, contains an excellent review on therapeutics, and we quote freely from the remarks by H. R. M. Landis on the subject:

Aconite.—He quotes Hare's article (*Ther. Gaz.*, Feb., 1912) on some forgotten facts concerning aconite. He points out that when we knew nothing of microörganisms as the cause of disease it was commonly supposed that hyperemias and congestions were solely dependent upon disorder in those areas through which blood vessels were freely distributed. Acting under this conception of inflammatory process it was a common practice for physicians to administer cardiovascular sedatives in the early stages of acute hyperemias, with the hope of drawing blood away from the congested area and of diminishing the amount of blood which was sent to it. No one who clearly understood the principle upon which aconite was used under these circumstances could have thought of employing it after inflammation had existed so long that actual pathological changes in the vessels and adjoining tissues had occurred. There can be no doubt, however, that with much improved conceptions of the cause of the disease the use of cardiovascular sedatives had very materially decreased, and aconite, which at one time was an exceedingly popular remedy, is not employed by many physicians from one year's end to another.

Pharmacologists and practical therapeutists have taught for some years that the dominant effects of therapeutic doses of this drug are to slow the pulse and directly or indirectly lower blood pressure; a multitude of experiments upon lower animals performed at different times by a large number of observers certainly support this view. In Hare's opinion, the average clinician who has used this drug sufficiently frequently to be a capable judge of its influence holds the view that its effect on man is similar to its effect upon the lower animals. He believes aconite has no influence in slowing the pulse and thinks the remedy possesses little value for this purpose, but he favors it when used for suitable cases, especially in "tobacco heart," in the over-acting hearts of athletes and in certain cases of tachycardia associated with neurotic symptoms. ,

Acetone Alcohol.. The results of experiments of disinfecting the hands by acetone alcohol is reported by Haberle (*Zeit. f. Geb. u. Gyn.*, 1911, Band lxix, 2). In 25 experiments the hands were rendered practically sterile, and remained so during and after the operations performed. The hands in many operations became somewhat sodden with moisture, and the virtue of the acetone alcohol method in its efficient action upon the upper layers of the skin. In experimenting, the hands were artificially infected with staphylococci and allowed to dry completely in atmosphere. The use of 30% acetone alcohol produces efficient disinfection. As regards the permanency of its action, the hands previously disinfected with acetone alcohol were examined after operations lasting 30 minutes, when perspiration forming in the hands has moistened the skin. It was found that the method was efficient, and that even when the germs were present they were in the vegetating form and not actively virulent.

Arsenic. Seiler relates the results obtained by him in the treatment of 33 patients suffering from chlorosis (*Deutsch Med. Woch.*, lviii, No. 32, 1905). Thirteen of these patients were treated with arsenic alone, 12 received iron only, and the remaining 8 were given a combined treatment with both iron and arsenic. Seiler gave the arsenic in the form of arsenous acid, in doses of from 0.005 gram to 0.01 gram a day, either in pill form or by subcutaneous injection. The patients treated with arsenic alone derived little or no benefit. The hemoglobin percentage after two or three weeks of this treatment increased slightly, but there was an actual fall in the number of red blood cells. In addition to this lack of improvement, untoward symptoms frequently occurred from the use of the arsenic. Consequently, Seiler believes that arsenic alone has no therapeutic effect upon chlorosis. Iron alone was given in the form of a modified Blaud's pill for four weeks. The hemoglobin percentage increased markedly, and the

number of red blood cells rose to nearly normal. The average of 49% hemoglobin rose to 87%, and the number of red blood cells increased from 4,000,000 to 5,000,000.

The patients treated with iron and arsenic in combination received in addition to Blaud's pill an average dose of 0.006 gram of arsenous acid a day. After four weeks of this combined treatment the average hemoglobin percentage rose from 37% to 96%, and the red blood cells increased from 3,000,000 to 5.100,000. Seiler believes that this combination of iron and arsenic has a more rapid and more complete curative action than iron alone.

Atophan. Several writers heartily commend this product for gout. Deutsch (*Münch. Med. Woch.*, 1911, lviii, 2652) thinks it is the best remedy yet proposed for gout. It seems to increase the ability of the kidney to excrete uric acid.

Atropine. Gardner (*Brit. Med. Jour.*, Feb. 24, 1912) gives the following advice as to the technique in atropine and open ether administration:

One hour before the administration of ether a hypodermic injection of atropine sulphate, 1/150 grain, is given with the object of preventing the considerable secretion of mucus in the air-passages which may be otherwise caused by ether. This also prevents sweating during the operation, and thereby retains the body heat. Atropine is also a respiratory stimulant and a vagal obtundent, both valuable qualities unhampered by contraindications. Morphine is not advantageous for routine employment, because it appears to induce oozing of blood from the wound during operation, and certainly retards the reappearance of the laryngeal reflex and the resumption of consciousness during recovery.

Boracic Acid. Hartley (*Brit. Med. Jour.*, April 13, 1913), formerly used boracic acid solutions for lavage of the bowel in cases of colitis, but after having seen symptoms arise in at least three patients, decided it might not be such a harmless method as one would be inclined to believe. Although when used as an intestinal douche he has not found it to cause any serious symptoms, it has apparently frequently caused marked symptoms of toxemia. He believes it is probable that this poisoning if in reality causel by boracic acid, is due to some idiosyncrasy, as one frequently has been carried out over a considerable period without any toxemia.

Saunders (*Brit. Med. Jour.*, March 16, 1912) reports a case of boracic acid poisoning which resulted from absorption of the drug from colonic irrigations given to relieve dysentery. The symptoms were first a rash resembling that caused by bromides, and then restlessness and delirium, followed by weakness. The symptoms developed suddenly and the rash lasted over ten days. The danger of life was considerable, but the patient recovered under careful watching after immediate withdrawal of the offending drug.

Camphor. The use of camphor has been highly spoken of by several observers in the treatment of pneumonia. Lowenstein and Wachter (*Med. Klin.*, 1912, Vol. VIII) reports 184 cases treated with camphor and caffeine stimulation with a mortality of 10.4 per cent. Wachter has had equally good results from the use of camphorated oil, of which from 3 to 5 Cc. are injected once or twice daily as a routine measure.

In the cases of pneumococcic pneumonia cited by Seibert (*Med. Rec., lxxxi,* 743) camphor injections invariably reduced the toxemia gradually until practically normal conditions were reached three or four days after the first injection, while the alveolar exudate remained, to be absorbed later on. This phenomenon and the absence of a crisis were noticed in every case.

Seibert's attempts to interfere with human and animal pneumococcic infections with camphor have established the following facts: (1) That 10 Cc. of a 30% camphorated oil (equal to 36 grains of pure camphor) injected hypodermically to 100 pounds of human body weight every eight to twelve hours, do not produce symptoms of poisoning, in fact are harmless; (2) that much larger doses (to the body weight) in rabbits are equally well borne, and (3) that "these quantities of camphor materially assist in overcoming pneumococcic toxemia," and (4) that the earlier this treatment is resorted to the better the results.

Chloretone. Bickle never operates under a general anesthetic if possible, without the previous administration of chloretone (*Ther. Gaz.*, March, 1912). The dosage is important. He invariably administers 15 grains in a capsule one and a half hours before the time fixed for the operation. Inquiry into cause of failures from this drug to prevent postanesthetic vomiting and discomfort has generally been shown to be due to an insufficient dose. For dental cases and adenoids and tonsillotomy cases he never gives the drug, as a little vomiting is useful in getting rid of swallowed blood.

Ergot.—Sharp (*Proc. Royal Soc. Med.*, May, 1911) considers 30 minims of ergot an average dose, and 45 minims too large, believing that full doses diminish, rather than increase, uterine contractility. In the treatment of abortions and ordinary uterine bleeding he thinks that a dram of the liquid extract given in twenty-four hours is quite sufficient.

Attention is called to the fact that it is the custom to administer ergot as soon as it is evident that the birth is accomplished, or so nearly accomplished that the child will be expelled before the effects of the ergot can be exercised. On the other hand, there are some obstetricians who think that it should not be used as a routine measure, and with this class Sharp agrees, believing that only a small number of women in labor need ergot, the majority being best without it. He emphasizes the points, namely, that ergot should not be given unless the os is fully dilated, unless there is no obstruction, bony or otherwise, and finally, unless the soft parts of the birth canal and outlet are soft and yielding.

Sharp believes that ergot not only collects the small non-effective pains into larger effective contractions by improving the tone of the uterine muscle fibers, but that it also tones up the abdominal muscles and the muscular system generally. Careful observations carried out by Sharp lead him to believe that if half a dram of the fluidextract is given in a small cup of hot tea it acts far more rapidly than physicians commonly think—sometimes as soon as four minutes, and rarely as late as twenty minutes. He does not think that either morphine or opium in any way inhibits or interferes with the action of ergot.

Glycerin.—Rusca (*Corresp. Blatt. f. Sweiz Aerzte. Basel,* 1911, xli, 737) seeks to revive glycerin as a dressing for wounds. Its water-attracting power serves to reduce the congestion in the region, while it keeps the wound clean by taking up the secretions and softening the necrotic tissue and crusts so that they can be readily removed, thus depriving the germs present of their favorite nests. Glycerin has also a slight sterilizing action which might be enhanced by the addition of some disinfectant. There cannot be the slightest danger from the use of glycerin, he continues. As even taken internally in large doses there does not seem to

be any toxic action. He saturates a compress with official glycerin, and applies it to the lesion, covering with an air-tight cover, and changes the dressings twice a day. He has obtained excellent results with this technique in 100 cases of various local infectious processes, the lesions soon clearing up and healthy granulation following, except the tuberculous lesions; these do not seem to be influenced. The glycerin dressings are free from the coagulability action on albumin, which is one of the disadvantages of alcohol dressings.

Hexamethylenamin.—Hare (*Ther. Gaz.*, June, 1912) thinks this the most important addition in therapeutics, outside of salvarsan, of those substances which, while comparatively harmless to the patient's body, inhibit the growth of pathogenic organisms.

Hare calls attention to the most recent investigation on this subject by Jordan in the *Proceedings of the Royal Society of Medicine*. The doses that he employed were 10 grains three times a day, either alone or in conjunction with acid-sodium phosphate or potassium citrate. He found when pathogenic organisms were present that the disinfectant or germicidal influence of urotropin amounted to little or nothing if the urine was alkaline or faintly acid, but became very powerful if the urine was rendered distinctly acid by simultaneous administration of acid sodium phosphate. Conversely, that the simultaneous use of potassium citrate, whereby the urine was made alkaline, diminished the antiseptic power of urotropin. Hare points out that it has been known to practical therapeutists for many years that urotropin does best in cases of vesical irritation and inflammation, not dependent upon distinct infection, when the urine is alkaline and loaded with phosphates, since it tends to make the urine acid; and, conversely, it may increase bladder irritability if the urine is excessively acid. It is important in the treatment of these cases to determine whether the trouble is dependent upon the presence of an infecting organism, then to determine the reaction of the urine, and if it be alkaline to administer acid sodium phosphate, or, perchance, bitartrate of potash, to increase the urinary acidity if ordinary pathogenic germs are present.

Vanderhoof recommends hexamethylenamin as a remedy of great value in cases *of acute colds*, and in patients suffering from acute and chronic bronchitis. The drug should be given in large doses, accompanied by the copious drinking of water. A new product of this order is hexamethylenetetramine camphorate, which is a combination of camphoric acid and hexamethylenetetramine.

Iron.—Zwetkoff (*Zeit. f. Exp. Path. v. Ther.*, 1911, ix, 393) believes that the treatment of chlorosis with arsenic in the form of arsenous acid does not result in an increase of the hemoglobin or of the number of red blood cells. The action of arsenic in chlorosis is in direct opposition to its effects in pernicious anemia. In the latter, the arsenic treatment is of the highest value. The difference of action of arsenic in these two diseases of the blood-forming organs is dependent upon some difference in the nature of the two diseases. The treatment of chlorosis with iron in the form of Blaud's pills results in a rapid increase of the hemoglobin, and when the blood cells are diminished an increase in their number. The treatment of chlorosis with iron and arsenic combined gives a definitely increased improvement in comparison to the results obtained by the treatment of chlorosis with iron alone.

Menthol.—Leroux (*La Presse Med.*, 1912, XX, 113) shows that this drug is far from harmless. Often its results are very grave. He refers to thirteen articles on the administration of menthol to new-born infants to facilitate artificial respiration. Some of them have not only had obstruction of respiration accompanied by an excessive secretion of mucus, but there has also been evidence of spasm of the glottis with cyanosis, convulsive moments and syncope, and in one case, a child, aged one month, having received in the nostrils vaselin menthol of 2 per cent. strength, very shortly developed intense dyspnea. In other instances the symptoms consisted in marked pain in the nose, the result of intense irritation set up by the drug. In one instance an intense conjunctivitis developed. In still another such an intense inflammation of the skin of the face occurred as to make it resemble erysipelas; there was thickening of the skin, tumefaction with redness and violent headache.

He has seen several patients in whom the too free use of menthol locally in the nose apparently produced a herpetic eruption. Finally, Leroux points out that certain patients seem to develop a condition of "mentholism," which is analogous to cocainism or morphinism, in that the patient continually inhales the menthol vapor in order to get relief from nasal congestion, and that this produces a constant irritation with hypertrophy of the nasal mucous membrane, which can only be relieved by galvanocautery or turbinotomy.

Pituitary Extract. Klotz (*Munch. Med. Woch.*, 1912, lix, 1137) recommends pitutiary extract in the treatment of rachitis. He supplemented it with calcium carbonate to supply material for bone growth, and states that within five or six weeks the five children so treated became transformed. The effects observed in these cases and in osteomalacia suggest, he states, that the true cause of both this and rachitis is some disturbance in the phosphorus rather than in the calcium metabolism. A number of clinical and experimental facts sustain this view.

Thymol. Bozzolo, in 1881, discovered that thymol was efficient in expelling the hookworm. In an article (*J. A. M. A.*, June 8, 1912), he recalls the extraordinary results obtained in the treatment of uncinariasis in Porto Rico. The first report of the Commission appointed to attack the problem in Porto Rico reported 4,474 cases cured; later, in 1911, 47,000 were reported as having been cured.

Bozzolo states that as much as 12 grams of thymol have been given in twelve hours, 2 grams every two hours, always well enveloped in capsules, and no serious disturbance was noted; in one case the dose was increased to 15 grams. Where after-treatment, and when examination of the feces showed an absence of ova, the patient remained anemic on discontinuing treatment, the hemoglobin content increased rapidly when fresh doses of thymol were given.

Schultz (*J. A. M. A.*, Spe.t 30, 1911) concludes after a study of beta-naphthol, male fern, eucalyptus, chloroform and thymol, that he is justified in reaching the following conclusions:

1. Any practical vermifuge, to be effective in expelling uncinaria or ankylostoma, must be an irritant of sufficient intensity to cause the parasite to loosen its hold.

2. It should paralyze the neuromuscular apparatus to hinder the parasite from making fresh attachment.

3. Its relative toxicity for the parasite must be either much greater than that for the host or be much more readily absorbed by the former than by the latter.

Strychnine. *The J. A. M. A.* (Vol. LVIII, p. 414, 1912) calls attention to the uncertainty of our knowledge regarding the effect of strychnine on the blood

pressure. While toxic doses of the drug undoubtedly raise the blood pressure in animals, it is not very clear that given in medicinal doses the drug has any such power in human beings. What evidence is at hand gives such divergent results that no definite conclusions can be drawn.

The editorial cites a paper of Cabot's in which he reports 50 cases, all febrile, in which the results from strychnine were negative, so far as the blood pressure was concerned. Cabot took the blood pressure for days at a time, the patient receiving from one-eighth to one-sixth of strychnine daily; the drug was administered in some cases by mouth and in others hypodermically.

In contrast to Cabot's results, Cook and Briggs made blood pressure estimations in patients suffering from a wide diversity of conditions, including shock, childbirth, febrile conditions, etc. The blood pressure readings were made at five-minute intervals preceding and following the administration of various drugs. Strychnine was given hypodermically in doses ranging from one-sixtieth to one-tenth of a grain.

As a result of their study they are led to conclude that strychnine gives a rise in blood pressure which is delayed in onset, but lasts from one to four hours.

The drug is most satisfactory for continued use in cardiovascular cases, as it tends to maintain a uniform pressure free from intervals of depression.

The drug failed to raise the pressure in moribund and hopeless cases; in normal individuals with an apparently healthy cardiovascular apparatus; and in cases in which the pressure was already maintained at a "stimulation level" by previous stimulants.

Sulphur. Huerre (*Rev. de Ther.*, March 15, 1912) states that since sulphur, as such, is generally poorly tolerated by the skin, he had sought to combine it with various oils and has found that a combination with castor oil gave the best results. By heating oils with sulphur to 106° C. a true compound—a sulphurated oil—is formed, which is advantageous in that it may readily be associated with substances in general use in dermatology, such as chrysophanic acid and pyrogallol. Salts of mercury may also be easily incorporated in the oil.

PROGRESS IN NON-MEDICINAL THERAPY.

The progress of serums and vaccines are touched upon by Landis in his therapeutic referendum in *Progressive Medicine*. Among the practical applications of these agents a few references are appended.

Anti-influenzal Serum.—Serum treatment of influenzal meningitis has been advised by Wallstein (*Jour. Exp. Med.*, 1911, xiv, 73). Since more accurate studies on spinal fluid have been made, an increased number of cases of influenzal meningitis have been found, almost all of which have been fatal. Almost all cases are due to an influenzal bacteremia. The organism grows in the subdural space and is swept through the blood. The organism was cultivated on agar slants for twenty-four hours, then washed off with salt solution, and two such cultures, 2 Cc. in all, were injected into the canal of a monkey, giving a disease fatal in thirty-six hours to four days, and comparable to that in man. A goat was then treated with living organisms for eighteen months, when opsonins and agglutinins appeared in his serum, but the serum was not bactericidal *in vitro*. This serum was effectual in securing recovery if injected into the spinal canal twenty-four hours after inoculation.

Flexner says that influenzal meningitis can no longer be considered a rare disease. All but 6 of the 58 cases thus far reported have terminated fatally. He advises treatment for influenzal meningitis in human beings in the same manner in which the serum for epidemic meningitis is employed.

Antirabic Virus.—In a paper entitled "Antirabic Immunization with Desiccated Virus," before the American Association of Pathology in Philadelphia, April 6, 1912, Harris gives the details of an elaboration of the Pasteur treatment which bids fair to be of considerable practical value. While the serum now available possesses immunizing or therapeutical value lasting but a short time—a couple of weeks—the product described by Harris preserves its efficiency during a minimal period of 148 days. This is due to a special mode of preparation, the steps of which are: Desiccation of the brain of an inoculated rabbit; reduction to a fine powder and then to a thin paste with water; freezing to solidity. The result is that the paste not only preserves its activity, but it can be sent any distance, its period of efficiency permitting it to be transported over the entire world. On reaching its destination the paste is made ready for immediate use by reduction to powder and solution.

The experimental and therapeutical aspects of the new measure, though still limited to Harris' own labors, are encouraging. He was unfortunate enough in the course of his investigations to inoculate himself, and thus to submit his product to a test in which loss of his own life would have been the penalty had it failed him—a rather unusual experience. Therapeutical tests were likewise made on numerous animals. In all animals thus inoculated under unquestionable conditions, and in which the new preparation was employed, rabies failed to develop, while in others, similarly inoculated but not treated, the disease developed. In the human subject the measure has been tried in only 20 cases so far, some after bites from rabid dogs, others during various stages of developed hydrophobia. Prompt recovery was obtained in all.

Antiscarlatinal Serum.—Reiss and Jungmann (*Deutsch. Arch. f. Klin. Med.*, 1912, cvi, 1548), report the employment of serotherapy in scarlet fever in 12 cases, and call attention to the remarkable turns for the better in 10 of these patients after an intravenous injection of from 40 to 100 Cc. of serum drawn from several scarlet fever convalescents and mixed.

The disease was unusually severe in each case, and the temperature and pulse dropped by nearly 3° C. in from nine to fourteen hours, the drop beginning after two to four hours. The serotherapy did not seem to have the slightest action on any secondary phenomena, the lesions in the tonsils, lymph nodes and joints continuing or developing unmodified by the serotherapy. This fact is regarded as proof of the efficiency of the serum, as the fever dropped and the general condition materially improved notwithstanding the presence or progressive course of a destructive angina, for example. They now make it a rule to apply the serotherapy only in those cases in which recent scarlatinal infection is responsible for serious symptoms. The patients all began to convalesce the fourth day or fifth at latest, while in 200 other cases the fever lasted from four to fifteen days, with an average of six days. The fever terminated by crises in only 2 of these 200, while this occurred in all the 10 serum-treated cases. They prefer to centrifugate the serum from at least three convalescents and distribute it in fused ampullas containing each 50 Cc., to which 5 drops of a 5% phenol solution has been added. Each separate serum is tested beforehand by inoculation and for the Wassermann reaction.

Antitetanic Serum.—Berghausen and Howard (*J. A. M. A.*, 1912, *LVIII*, 105) feel, after a careful study of perforating, penetrating and lacerating wounds contaminated by soil or manure and all blank cartridge wounds should be seriously regarded. After proper treatment 1,500 units of antitetanic serum should be used and repeated in one week if suppuration has not ceased.

Vaccines.—Vaccine Treatment of Simple Goitre.—McGarrison (*Lancet*, Feb. 10, 1912), in studying the amebic flora of the intestine in cases of endemic goitre in India, was led, by the uniformity of the bacterial growth, to try the effects of a vaccine made from this composite growth upon some of the cases. The effects were striking, there being a prompt decrease in the size of the enlarged gland and complete recovery in many cases. Upon examination of this bacterial growth it was found to consist mainly of a somewhat altered type of colon bacillus. He therefore used a vaccine made from this alone, and obtained similar good results. He also tried the effects of a vaccine made from a staphylococcus and one from a spore-bearing bacillus, with favorable results from both. He treated 33 cases in all, with most excellent results, but calls attention to the fact that the treatment is suitable for recent cases of parenchymatous goitre only. The results were best when the composite vaccine was used. By way of explanation of the action of these varied vaccines, he suggests that the cases are due, as he has previously shown, to an ameba in the intestine; that the thyroid is the means of combating certain toxins normally present in the intestine; that when to these there is added the specific virus of goitre (from the ameba) there is an extra strain put upon the gland, and in consequence of this it undergoes hypertrophy. By the use of one of the vaccines, which in itself is in no way specific for goitre there is removed from the thyroid gland the added strain of neutralizing the toxins arising in the intestine from the bacteria there present, and the gland is able to return to its normal size and take care of the specific toxin of the disease. This conclusion is substantiated in part by experiments upon animals.

Pneumonia.—Rosenow (*Ill. Med. Jour.*, 1912, xx, 399) has succeeded in separating from virulent pneumococci a large part of the toxic material which goes into solution on autolysis, and have left in the pneumococci that part which stimulates antibody formation more promptly and more energetically without first producing a negative phase. The number of "detoxicated" or autolyzed pneumococci inoculated can now be much greater than those merely killed by heat. When this material is inoculated within 48 hours after the onset of an attack of lobar pneumonia, the course of the disease is often seemingly much modified. The temperature comes down within 24 to 36 hours, and the patient recovers promptly; when given later, as would be expected, the effect is less pronounced. In a series of cases at the Cook County Hospital last winter, 50 treated and 50 alternate untreated cases, used as a control, the mortality of the former was 32%, while in the latter it was 50%.

Raw (*Lancet*, 1912, clxxxii, 464) treated 207 cases of lobar pneumonia by a *stock pneumococcus vaccine*. The total mortality in the cases treated was equivalent to 16%. Raw notes, as a striking feature, that he attributes to the vaccine treatment the total absence of empyema in this series of cases, and the development of but few other complications. However, he saw no effect in hastening the appearance of the crisis or in shortening the duration of the disease. Raw says he is convinced that we have in pneumococcus vaccine a valuable aid in the treatment of pneumonia, and, although not a specific remedy, it ought always to be used in cases of a virulent type.

Typhoid Fever treatment has been so thoroughly covered in the pages of THE MEDICAL TIMES that the subject is not taken up in this review.

Rheumatic Polyarthritis.—Wolverton (*Med. Rec.*, Oct. 28, 1911) used vaccine therapy in acute rheumatic polyarthritis, but admits that six cases do not form a large series from which to draw conclusions. All his cases were of a very severe character, and the response to the exhibition of streptococcus pyogenes vaccine was in every case so prompt and satisfactory that he has felt impelled to report his cases and to urge others to give the remedy extensive clinical trial. Moreover, in at least four of the six cases, the salicylate treatment was not followed; and in two cases the patients grew worse in spite of faithful adherence to salicylate treatment. So the uniformly good and prompt results must be ascribed to the vaccine. In every case the temperature quickly fell, there was a rapid cessation of pain and disappearance of signs of inflammation. The patients, moreover, remarked a feeling of exhilaration, or stimulation, which came on in from three to forty-eight hours after the inoculation. In no case was there any evidence of a harmful negative phase. In none of the six cases above reported did any cardiac valvular lesion develop subsequent to the employment of the vaccine. The vaccines employed in the treatment of the cases were all "stock" vaccines made from several strains (at least six, he believes) of streptococci obtained from various cases of streptococcic infections.

Heliotherapy.— Direct *sunlight treatment of surgical tuberculosis* as advocated by Rollier has attracted considerable attention in recent years. Witmer and Franzono (*Deutsch. Zeit. f. Chir.*, 1912, cciv., 301) report from Leysin, Switzerland, the experiences at Rollier's private sanatorium in the treatment of surgical tuberculosis. Witmer describes some typical cases of tuberculous processes in the shoulder, elbow, wrist, spine, pelvis, hip-joint, knee and ankle, with other cases in which the long bones were involved, or the glands, peritoneum, urogenital apparatus, etc.

He cites 456 cases of these various groups with only 23 out of the total in which no benefit was realized. It is evident, he declares, that such results as he reports will do much to restrict operative measures in extrapulmonary tuberculous processes. They should be applied only when it is positive that the focus is an isolated one, and when it is certain that every trace of diseased tissue can be removed. Austin describes her visit to Rollier's hospital at Leysin (*Med. Rec.*, June 8, 1912), where little tuberculous children are exposed for hours daily, without clothing of any kind, to the sun's rays in midwinter at an altitude of 5,000 feet. The body of the patient is exposed to the sun's rays in galleries. The actual seat of the disease is uncovered for five minutes only the first day, that the skin may not be burned or blistered; the next day the region is treated for two periods of five minutes each, and on the third day these exposures are extended to fifteen or twenty minutes. Each time a larger area of skin is exposed, so that by the end of the week or ten days the entire body, the head excepted, is lying nude in the sun; later the head, too, is uncovered. Rollier does not concentrate any one ray (Finsen), but uses diffused white light just as it comes from the sun.

Legal Medicine

CHIROPRACTICS TERMED PRACTITIONERS.

Irregular practitioners were dealt a severe blow in the Third District Magistrate's Court, New York, recently when Magistrate Freschi held Otto Scholz, alleged to be a chiropractic practitioner, for trial on the ground of illegally practising medicine, despite the fact Mr. Scholz made his "adjustments" under the supervision of a registered physician.

Judge Freschi's decision was, in part, as follows:

"Chiropractic adjustments as practiced by chiropractors are charged to be a violation of the Public Health Law, defining the practice of medicine as follows: 'A person practices medicine within the meaning of this article, except as hereinafter stated, who holds himself out as being able to diagnose, treat, operate or prescribe for any human disease, pain, injury, deformity or physical condition, and who shall either offer or undertake by any means or method to diagnose, treat, operate or prescribe for any human disease, pain, injury, deformity or physical condition.'

"There is no claim by the defendant that he is a licensed physician, but his defense is that the acts performed by him do not constitute the practice of medicine within the contemplation of law. At the examination it appeared from the testimony of Mrs. Frances Benzecry, the investigator for the New York County Medical Society, that she made several visits at the office of 'Scholz & Scholz, Graduate Chiropractors,' at No. 142 East 27th Street, New York, and there told the defendant that she had severe pains in the limbs, from which she claimed she suffered, and that the defendant told her he would give her a course of ten adjustments for $10, to be paid in advance. She was then examined by a physician, Dr. Leopold Hibbe, and later received the 'adjustments' at the hands of the defendant in the presence of the doctor. The adjustments given by the defendant consisted in rubbing that part of the head behind the ears, the neck, shoulders and pressing the vertebrae of the complainant's spine with his hands for the purpose of 'removing the cause of the disease or direct and free impinged nerves,' as defendant testified.

Dr. Hibbe admits he has no office with the defendant, with whom, he says, he is in partnership, dividing any profit and sharing any loss that there may be in their joint business. On one of Mrs. Benzecry's visits to the defendant he gave her his card containing the firm name as above indicated, and the additional words printed thereon: 'Consultation and spinal analysis free,' with the hours, addresses of city and Mt. Vernon, N. Y., offices and terms stated. He also gave her literature entitled 'New Road to Health' and the 'Chiropractic Idea—The New Method of Analyzing the Symptoms and Adjusting the Physical Cause of Disease.' The back of the defendant's business card contained this matter: 'If you are sick, no matter what ails you, and have tried everything in vain, take chiropractic adjustments and get well. * * * Our work is done on the human switchboard, the spine.' This is, in my opinion, a holding out by the defendant as able to cure sickness and alleviate suffering, and that he does so as a business, thereby conveying to the public an impression that he practices medicine lawfully. The defendant advertises himself as a graduate chiropractor and issues printed matter that these adjustments are a new system of drugless healing. He treats it as a science. 'Chiropractic' is a newly coined word from two Greek words, which literally mean doing with the hand. The chiropractor claims that he has developed a new science for the elimination of diseases which emanate from the great nerve center, the brain.

"Counsel for the defendant argues that even conceding that the defendant's business is comprehended by the statute as applied to him, the complaint should be dismissed for two reasons: First, his method of treatment and practice is not such as is within the power of the Legislature to regulate, restrict or prohibit; second, the regulation and requirement of the act, as applied to his method of practice, are arbitrary and unjust, because his business does not require the qualifications prescribed by the statute for those undertaking to practice medicine and surgery. I must rule that the Public Health Law is clearly within the police power of the State, and that its exercise is reasonable and constitutional (People vs. Mulford, supra). The defendant certainly did 'treat' the investigator for a 'pain' that she said she had and for an alleged 'deformity' of the spine. Dr. Hibbe testified that the manipulation of the spine would relieve both the conditions and effects in Mrs. Benzecry's case. He simply showed defendant exactly what vertebrae should be adjusted.

"Further, the defendant contends that he has not violated the Medical Law, inasmuch as he worked under the direction and supervision of a registered physician. I do not think that such fact, even were it to be found as a fact, takes the case out of the pale of the law. No physician can, in my opinion, delegate his power and authority, which is personal, to another, unlicensed and unauthorized to practice medicine. It is the policy of the State to regulate in such matters as the practice of medicine as to the qualifications of all those who may lawfully practice it as a profession. The protection of the public health is of vital importance to a community, and none but those possessing the knowledge and skill and character required by law should be allowed to exercise the prerogatives of the medical man. It is the settled law of this State that a corporation may not employ a physician to treat the ailments of persons applying to it for medical care; nor can it practice medicine or advertise to practice medicine by and through duly licensed and registered physicians, practising under his name. An individual may not practise medicine nor advertise to do so under any name or designation other than his own, and may not employ registered persons to practice for him so that he may share the profits of medical practice. I believe it is unlawful for any person duly licensed as a physician or surgeon to permit an unlicensed person to do or perform any acts which constitute the practice of medicine; and any designation by such unlicensed person tending to imply him as a practitioner of medicine is prohibited.

The testimony in this case shows that the defendant Scholz maintains an office in conjunction with a physician duly licensed to practice medicine in the State of New York, and registered to practice in the County of New York; that persons applying at the office of the defendant Scholz for treatment are received by him, their ailment is inquired into, and a treatment known as 'chiropractic' is recommended to them as beneficial for their existing condition, and a fee is charged them for the giving of that treatment for the purpose of removing the cause of the sickness from which the patient is suffering; that the physical examination and diagnosis of the patient is made by a physician; that an unregistered and unlicensed person then, upon the diagnosis of a physician, attempts to and does undertake to treat, cure and remove the cause of the illness, and improve

the physical condition of the patient by giving certain thrusts called 'chiropractic adjustments' to the several vertebræ of the spine; that the treatment given consists of a series of visits on the part of the patient to receive a form of treatment for the purpose of curing disease; that the unregistered person receives fees from patients and pays 50 per cent. of his fees to the registered physician, who diagnoses the ailment of the patient.

"As the prosecution admits, 'every one has the right to employ whom he chooses to treat him for disease, but the law, in order to protect the patient, prohibits all but licensed practitioners from accepting such employment' (Matter of Bandel vs. Board of Health, 193 N. Y., 133, 140). I question the ethics of a member of the medical profession who will lend himself in an association with a person who, although not licensed and registered to practice medicine, claims to be entitled to carry on a practice of his alleged profession to cure and remove the cause of disease. The medical profession is one that deals with the public health and the well-being of the individual in the community and the practice of it should be, as it is, a proper matter for State regulation. Legislation upon this subject has been held to be clearly within the police power. If this were otherwise, charlatans and quacks, whose imagination seems to play a great part in adopting so-called 'new ideas' for healing the sick and who claim that they can be of the greatest service to their clients in the way of cure, might freely conduct their business without being subjected to criminal prosecution, irrespective of any real injury or fatality resulting from their practice. The evil lies in the combination which licensed physicians enter into and make with unregistered persons who, under the guise of some 'new idea' or cult, attempt to cure ills and treat for the prevention of disease, and then the fee splitting calls for condemnation.

"It is to be regretted that provision is not made in the Public Health Law for some power in the State Board of Health to recommend to the State Board of Regents the revocation or suspension of a license to practice medicine, in addition to the grounds stated in section 161 of the Public Health Law, whenever in any case, made out on notice and after hearing, a licensed physician delegates his power or perpetrates any fraud or is guilty of any conduct tending to degrade or dishonor the medical profession.

"I must hold the defendant for trial. The acts charged against the defendant constitute, in my opinion, the practice of medicine."

TRANSACTIONS OF THE AMERICAN ASSOCIATION OF CLINICAL RESEARCH.

The fourth annual meeting of the American Association of Clinical Research was held November 9, 1912, in Dubois Hall, Academy of Medicine, New York.

The meeting was called to order by the permanent secretary. In the absence of President Peebles, E. S. Bailey, M. D., of Chicago, was elected temporary chairman.

The report of the secretary-treasurer was unanimously adopted. The association has paid all its debts. Authority to enter into contract with a medical journal to serve as the official organ beginning with January 1, 1913, was given. The opening of the Boston Polyclinic as the first home dedicated to the object of the American Association of Clinical Research was favorably received.

The meeting then nominated and elected the following officers for the year 1912-13: President, F. H. Blackmarr, M. D., Chicago; first vice-president, L. K. Hirshberg, M. D., Baltimore; second vice-president, Alice Conklin, M. D., Chicago; secretary and treasurer, James Krauss, M. D., Boston; registrar, S. R. Klin, M. D., New York; research committee for three years, A. R. Peebles, M. D., Boulder, Col.; educational committee for three years, H. D. Schenck, M. D., Brooklyn. It was voted unanimously to hold the next meeting in Chicago.

The scientific session comprised the reading of the following papers, First Vice-President L. K. Hirshberg, M. D., in the chair:

1. "The Negri Bodies," by S. R. Klein, M. D., New York. The demonstrations of these protozoa-like bodies in the nerve substance of rabies brought out a lively discussion in which Drs. E. Stillman Bailey, L. K. Hirshberg, James Krauss, F. L. Newton of Boston, and Griswold of Kensington, Conn., participated.

2. "Radium and Thorium Therapeutics," by F. H. Blackmarr, M. D., Chicago, with discussion by Drs. Hirshberg, Krauss, John Martin Craig of Lakewood, N. J., and Bailey.

3. "Electricity: A Neglected Resource in the Treatment of Rectal Diseases," by F. H. Williams, M. D., Boston.

4. "Therapeutic Possibilities of Manual Adjustment," by Dr. R. K. Smith of Boston, with a discussion by Drs. Krauss, Newton, Williams, Hirshberg, in which it was emphasized that it was not fair to quote passages from writers and make it appear as though they were necessarily authorities, that the only authorities in medicine are substantiated facts, that it is a mistake to consider pathology to apply only to microscopic alterations, that it ought to be known that the steel guided by the hand of a surgeon is guided by the brain just as much as is the hand of the most astute mechanical manipulator.

5. "Medical Efficiency," by Ira S. Wile, M. D., New York, with discussion by Drs. Newton, Krauss, Hirshberg, and Griswold. They dwelt upon the necessity for curative medical efficiency, although it was admitted that preventive efficiency is now in the eyes of the world.

6. "Disease Conditions Expressive of Correct Diagnosis: Parts I and II," by James Krauss, M. D., Boston, with discussion by Dr. Hirshberg, favoring an adequate medical nomenclature.

7. "Ectopic Pregnancy," by Frank L. Newton, M. D., Boston, with discussion by Drs. Bailey, Hirshberg, Krauss and Griswold. Dr. Newton placed the essential points for the recognition of ectopic pregnancies in a clear view.

8. "Atrophic Serum for Cancer," Frederick Gaertner, M. D., Pittsburg, Pa.

9. "Indicanuria," F. C. Askenstedt, M. D., Louisville, Ky.

10. "The Truth Behind Your Dream," L. K. Hirshberg, M. D., Baltimore.

11. "The Acid Test in Therapeutics," by John Aulde, M. D., Philadelphia, Pa.

12. "The New Chemistry and the New Materia Medict," by Dr. Hermann Hille of Chicago.

13. "The Two Most Far-Reaching Discoveries in Medicine," by James Krauss, M. D. This was the public educational address, given in conformity with Article V of the by-laws, and brought the fourth annual meeting of the association to a close.

JAMES KRAUSS, M. D., Secretary.

The Physician's Library

Food in Health and Disease. By Nathan S. Davis, Jr., A. M., M. D., Professor of Medicine in Northwestern University. Second Edition. Cloth, 450 pages. Price, $3.50 net. Philadelphia: P. Blakiston's Son & Co., 1912.

The recognition of the necessity of a more careful insight into the scientific study of dietetics has lead to the production of this volume. The result is a thoughtful treatise on (1) general principles of diet and diet in health and (2) diet in disease. Both divisions are well handled. The derangements of the digestive tract are carefully described and the proper dietetic requirements outlined. The caloric value of different foods are shown and the salient points on every subject are well covered. Every phase has been comprehensively treated and the reader is aided by a well adapted index.

A Manual of Personal Hygiene: Proper Living Upon a Physiologic Basis. By eminent specialists. Edited by Walter L. Pyle, M. D., Assistant Surgeon to the Wills Eye Hospital, Philadelphia. Fifth edition, revised and enlarged. 12mo. of 516 pages, illustrated. Cloth, $1.50 net. Philadelphia and London: W. B. Saunders Company, 1912.

The excellence of this book, which has been before the profession for twelve years, is augmented by a chapter on food adulteration and deterioration by H. W. Wiley, a very useful compendium in itself. The object of the book, to teach the laity how to keep healthy, is splendidly carried out. The hygiene of the digestive apparatus, skin, vocal and respiratory apparatus, eye, ear and brain is discussed, and there are also chapters on physical exercise, body posture and domestic hygiene.

The book can be enthusiastically recommended to the laity, and even medical men can find much of value within its pages.

Building a Profitable Practice. By Thomas F. Reilly, M. D., Professor of Applied Therapeutics in Fordham University. Cloth, 287 pages, illustrated. Philadelphia and London: J. B. Lippincott Company, 1912.

This book can be read with profit by every young medical graduate. A ripe experience as practitioner and teacher has formed the basis of the material contained therein and the prospective physician following the precepts laid down would escape many professional pitfalls.

Among the interesting and instructive chapters are those on the office, medical finance, collections, bookkeeping, professional ethics, aids in practice and personal manners and appearance.

Medicine in general is too altruistic. We need some attention to the practical business end and this volume fits in excellently.

Diseases of the Stomach, Intestines and Pancreas. By Robert Coleman Kemp, M. D., Professor of Gastrointestinal Diseases, New York School of Clinical Medicine. Second edition, revised and enlarged. Octavo of 1,021 pages with 388 illustrations. Cloth, $6.50 net; half morocco, $8.00 net. Philadelphia and London: W. B. Saunders Company, 1912.

The growing importance of the diseases of the gastro-intestinal tract makes the second edition of Kemp's book welcome. From the hit or miss methods of treatment of those diseases in the past we are rapidly developing a logical line of reasoning along medical lines and added to this we have a definite surgical procedure which is an excellent adjunct to other treatment.

The author has gone into the medical and surgical treatment of the gastro-intestinal tract at great length and aided by a wealth of unusually good illustrations has made his subject clear and lucid.

The work is one which will prove decidedly helpful to the practitioner who has to treat the hitherto little understood disease conditions of the alimentary tract.

Pathogenic Bacteria and Protozoa. By Joseph McFarland, Professor of Pathology and Bacteriology in the Medico-Chirurgical College, Philadelphia. Seventh edition, thoroughly revised. Octavo of 878 pages, 293 illustrations, a number of them in colors. Cloth, $3.50 net. Philadelphia and London: W. B. Saunders Company, 1912.

It speaks well for the growing interest in bacteriological matters that this standard work has run to seven editions. No longer is the specialist the sole reader of such books. To-day the general practitioner is keenly intent to keep up with medical progress and the conspicuous place occupied by bacteriology in revealing the great secrets of the etiology of disease makes the findings of such eminent men as McFarland of very general importance.

This seventh edition is better than its predecessors, in that it has been carefully revised and several noticeable features introduced.

The Chemic Problem in Nutrition (Magnesium Infiltration. A Sketch of the Causative Factors in Disorders of the Nutrition as Related to Diseases of the Nervous System. By John Aulde, M. D., Demonstrator of Physical Diagnosis and Clinical Medicine, Medico-Chirurgical College, Philadelphia. Cloth. Price, $3.00. 410 pages, with 4 illustrations. Philadelphia: John Aulde, M. D., 1305 Arch Street, 1912.

This book is an exemplification of a theory, which though interesting, is not seconded with clinical data.

The theory is that magnesium infiltration is a defective oxidation, due to faulty diet, and produces increased tissue acidity and the calcium in the tissues is greatly lessened in amount with added deposits of magnesium. Pellagra is given, as an example, as maize lacks calcium. The present belief that maize is not the etiologic agent in pellagra would, therefore, have little weight as an example of Aulde's theory. It is not unlikely there may be a serious foundation to his hypothesis and we will anxiously await substantiation in the form of definite, demonstrable cases.

Surgery and Diseases of the Mouth and Jaws. By Vilray Papin Blair, A. M., M. D., Professor of Oral Surgery in the Washington University Dental School, and Associate in Surgery in the Washington University Medical School, St. Louis. 638 pages, with 384 illustrations. St. Louis: C. V. Mosby Company, 1912.

As surgery of particular parts is often slighted in works on general surgery, Blair has done a real service in presenting this thoughtful and elaborate work on oral surgery. The book is intended for the surgeon and the dentist, although the larger part is given over to the surgical conditions met with in the affected parts by the medical man.

(*Continued on p. 20.*)